

Middlesex University Research Repository

An open access repository of

Middlesex University research

<http://eprints.mdx.ac.uk>

Dimirtra, A. (2001) Understanding aesthetics in a virtual environment performance. A. DProf thesis, Middlesex University. [Thesis]

This version is available at: <https://eprints.mdx.ac.uk/6467/>

Copyright:

Middlesex University Research Repository makes the University's research available electronically.

Copyright and moral rights to this work are retained by the author and/or other copyright owners unless otherwise stated. The work is supplied on the understanding that any use for commercial gain is strictly forbidden. A copy may be downloaded for personal, non-commercial, research or study without prior permission and without charge.

Works, including theses and research projects, may not be reproduced in any format or medium, or extensive quotations taken from them, or their content changed in any way, without first obtaining permission in writing from the copyright holder(s). They may not be sold or exploited commercially in any format or medium without the prior written permission of the copyright holder(s).

Full bibliographic details must be given when referring to, or quoting from full items including the author's name, the title of the work, publication details where relevant (place, publisher, date), pagination, and for theses or dissertations the awarding institution, the degree type awarded, and the date of the award.

If you believe that any material held in the repository infringes copyright law, please contact the Repository Team at Middlesex University via the following email address:

eprints@mdx.ac.uk

The item will be removed from the repository while any claim is being investigated.

See also repository copyright: re-use policy: <http://eprints.mdx.ac.uk/policies.html#copy>

MX 0038526 3



The Sheppard Library
Middlesex University
The Burroughs
London NW4 4BT
NW4 4BT
020 8411 5852
<http://lr.mdx.ac.uk>



SHORT LOAN COLLECTION

Lib/3

LF/28

UNDERSTANDING AESTHETICS IN A VIRTUAL ENVIRONMENT PERFORMANCE

**A project submitted to Middlesex University in partial
fulfilment of the requirements for the degree of Doctor of
Professional Studies**

DIMITRA A.

STUDENT No. 9744718

National Centre For Work Based Learning Partnership

Middlesex University

NOVEMBER 2001

P1026071

Site HE TAAT	MIDDLESEX UNIVERSITY LIBRARY
Accession No.	0038526
Class No.	700.285 Dim
Special Collection <input checked="" type="checkbox"/>	

Dedicated... to my life's companion

C O N T E N T S

List of Diagrams	
List of tables	
List of photos	
Acknowledgements	
Glossary	
Abstract	1

SECTION ONE

1. Introduction	4
2. Methodology	11

SECTION TWO

1. Introduction	25
2. Historical Review of Visual Arts	25
3. Historical Developments of Visual Arts	30
4. The Performance's Non-Linear Narration	42
5. Virtual Performances and Devices	43
6. Virtual Performances – Art or Technology?	44
7. Virtual Environment	46
8. Conclusions	61

SECTION THREE

1. Introduction	65
2. Aesthetics	66
3. Interrupted Flow of Information	89
4. Authentic Art	93
5. Conclusions	95

SECTION FOUR

1. Introduction	99
2. Tools	100
3. Audience	140
4. Conclusions	149

SECTION FIVE

Conclusions and Recommendations	154
---------------------------------------	-----

BIBLIOGRAPHY	162
--------------------	-----

APPENDICES

D I A G R A M S

1.Structure of the Research Methodology Plan.	14
2.Research Wheel	14
3.Virtual Environment Performance.	46
4.Section Three.	64
5.Aesthetical Dimension of Virtual Performance	150
6.Virtual Performance's Interface Design Guidelines.	151

T A B L E S

CASE STUDY No. One	19
CASE STUDY No. Two	19
CASE STUDY No. Three	20
Greek Costumes AUTHOR'S EXPERIENCE	114
KALI The Goddess of Millenium AUTHOR'S EXPERIENCE	88
KALI The Goddess of the Millenium PARTICIPANT'S	125
KALI The Goddess of the Millenium PARTICIPANT'S	149
KALI The Goddess of the Millenium AUTHOR'S	124, 133, 145
KALI The Goddess of the Millenium INTERVIEW	136
KALI The Goddess of the Millenium PARTICIPANT'S	76, 123
KALI The Goddess of the Millenium AUTHOR'S	77
Mitologies AUTHOR'S EXPERIENCE	108
Mitologies AUTHOR'S EXPERIENCE	115
Mitologies AUTHOR'S EXPERIENCE	126
Mitologies INTERNET NOTES	73
Mitologies INTERVIEW RESULTS	118
Mitologies AUTHOR'S EXPERIENCE	87, 91, 107, 125, 130
Mitologies PARTICIPANT'S EXPERIENCE	146
Objects of ritual created by Will Bauer and	148
Robots + Avatars dealing with V Illusions	138
Robots + Avatars dealing with V Illusions	135
Robots + Avatars dealing with V. Illusions	136
Robots + Avatars Dealing with Virtual Illusions	139, 143
Robots + Avatars dealing with Virtual Illusions	137
Robots +Avatars Dealing with Virtual Illusions	131
Robots + Avatars dealing with Virtual Illusions	71, 84, 101, 104, 112
Robots + Avatars dealing with Virtual Illusions	122, 129
Robots + Avatars dreaming with the V. Illusions	119

P H O T O G R A P H S

Amazon City (V.P. Robots + Avatars)	104
Ancient Greek Theatre (Greek Tour. Guide 1999)	28
Ancient Militus (Hellenic Institute)	48
Ariadne, Beatrice, Mary Room (V.P. Mitologies)	130

B

Bill Viola's installation (Internet sources, Viola site 2000)	55
Byzantine Costumes (Hellenic Institute)	114

C

CAVE system (Internet sources, University of Illinois)	46
Corpocinema 1967 (Media History, ZKM)	53

D

Davinci's Skecth (V.P. Mitologies)	73
Dordogne, Northern France (Internet sources, Caveman's Art)	25

E

Egyptian Symbolic Art (Internet Sources Egyptian Art M.)	117
Egyptian Art (Internet Sources Egyptian Art M.)	26
Einstein on the beach (Internet SourcesPhilip Glass)	42
Engelbert multi-media desktop (Media History, ZKM)	35
EVE 1993 (Media History, ZKM)	53
Exposition (Internet Sources N.Y. M.M.)	33

G

Gateway D (V.P. Kali, The Goddess of the Millennium)	123
Gauguin, Paris (Walther I., 1989)	69
Gauguin, Tahiti Walther I., 1989)	69
Ghostcatching (Internet Sources, Gostcatching))	72
Gibson (Internet Sources, Gibson)	70

H

Household performance (Goldeberg, R., 1996)	40
---	----

I

Interaction System (Internet sources, University of Illinois)	136
---	-----

K

Kali's Gateways (V.P. Kali, The Goddess of the Millennium)	76
Kids' Participation in a V.Performance (Hellenic Institute)	114

L

Liquid Views (Media History, ZKM)	103
---	-----

M

Marc Canter (Internet sources, Media History, 2001)	56
"Mr Living Room" (Imagina, 2000)	44

O

"Ordinary" Hypertext (Druckrey, 1996)	36
---	----

P

Plant Growing (Media History, ZKM)	72
Root of Knowledge City (V.P. Robots + Avatars)	71

S

Scott Fisher's virtual environment (Int. Sources, Fisher's site, 2000)	31
Sensorama (Media History, ZKM)	39
Silhouettes (Internet sources, Media History, 2001)	38
Star Wars (Internet sources, Star Wars, 2001)	77

T

Temple of Zeus (Hellenic Institute)	116
The Avatar (V.P. Robots + Avatars)	129
The Boch City (V.P. Robots + Avatars)	112
The entrance (V.P. Mitologies)	108
The Four Door Room (V.P. Mitologies)	124
The garden (V.P. Mitologies)	109
The Interactive Trees (Media History, ZKM)	115
The Kali's Sculpture (V.P. Kali, The Goddess of the Millennium)	124
The Robot (V.P. Robots + Avatars)	111
The Royal Palace of Neapolis (Ioannou, 1974)	27
The Seven Churches (V.P. Mitologies)	73
The Skin City (V.P. Robots + Avatars)	119
The Snail, Matisse (Tate Modern, 2000)	93
The Virtual Museum (Media History, ZKM)	144
Theatre of Totality (Internet Sources N.Y. M.M.)	32
Traces (Cyberarts, 1998)	57

U

Ultimate Display (Internet sources, Media History, 2001)	38
--	----

V

VR is a hi-tech delusion (V.P. Kali, The Goddess of the Millennium)	30
---	----

Y

Ying Yang City (V.P. Robots + Avatars)	122
--	-----

Acknowledgements

During the period of a three – year lonely journey in the world of virtual performances, I met important people in this field that helped me to see and evaluate more clearly the step-by-step knowledge I gained.

I would like them to know that I am sincerely grateful, thank you.

A special thanks to my supervisors Prof. Derek Portwood and Prof. John Vince for their support and guidance.

Also my thanks to Maria Sklerou for the unending discussions on the subject and to Dr. Stavros Drossos, Helaina Armstrong, Panos Miaoulis and Yiannis Sampatis for their continuous support.

Finally, I would like to add a big thank-you to the members of my family that had the saintly patience to put up with me and support me throughout this period

Glossary of Book's Terms

AR

Artificial Reality Has a precise meaning in the work of Myron Krueger. Krueger's computer-controlled responsive environment means an unencumbered involvement in a computerized environment.

Bps

(Bits-Per-Second) -- A measurement of how fast data are moved from one place to another.

A 28.8 *modem* can move 28,800 bits per second.

Browser

A *Client* program (software) that is used to look at various kinds of Internet resources.

Byte

A set of Bits that represent a single character. Usually there are 8 Bits in a Byte, sometimes more, depending on how the measurement is being made.

CAVE

Cave Automatic Virtual Environment. Is an area in which one experiences a virtual reality performance

CUBE

Computer-driven Upper Body Environment. Is a small CAVE-like device for real-time interaction

Cyberpunk

Cyberpunk was originally a cultural sub-genre of science fiction taking place in a not-so-distant, dystopian, over-industrialized society. The term grew out of the work of William Gibson and Bruce Sterling and has evolved into a cultural label encompassing many different kinds of human, machine, and punk attitudes. It includes clothing and lifestyle choices as well.

Cyberspace

Term originated by author William Gibson in his novel *Neuromancer*. The word Cyberspace is currently used to describe the whole range of information resources available through computer networks.

Feelings

Emotional conditions

Fractal

Is a mathematical concept, but it does not appear in an approximate form in certain natural forms.

He/She, His/Her

Due to the frequency of this occurring and the word limit, the author uses he and she with reference to both genders.

Internet

Any time you connect 2 or more *networks* together, you have an internet - as in international or inter-state.

IT

Information Technology.

Megabyte

A million *bytes*. Actually, technically, 1024 *kilobytes*.

Mirror

Generally speaking, a copy of something.

MOO

(Mud, Object Oriented) -- One of several kinds of multi-user role-playing environments, so far only text-based.

Mosaic

The first *WWW browser* that was available for the Macintosh, Windows, and UNIX all with the same interface. Mosaic really started the popularity of the Web. The source-code to Mosaic has been licensed by several companies and there are several other pieces of software as good or better than Mosaic, most notably, Netscape.

Motion capture

A technology that tracks sensors attached to a moving body

MUD

(Multi-User Dungeon or Dimension) -- A (usually text-based) multi-user simulation environment. Some are purely for fun and flirting, others are used for serious software development, or education purposes and all that lies in between. A significant feature of most MUDs is that users can create things that stay after they leave and which other users can interact with in their absence, thus allowing a world to be built gradually and collectively.

MUSE

(Multi-User Simulated Environment) -- One kind of MUD - usually with little or no violence.

Realism

In a related sense, realism is the approach that treats cyberspace as an actual (phenomenological) world with its own particular kind of entities.

Real time

Simultaneity in the occurrence and registering of an event, sometimes called synchronous processing.

Telepresence

The projection of the self into a virtual reality world, for example allows surgeons to combine robotics tools with cameras inserted in the patient's body.

TFD

Transmit pressure Feedback Devices.

Travelling

A horizontal Camera movement on a track.

Virtual

A philosophical term meaning not actually, but just as if.

Virtual Environment

A scene or experience with which a participant can interact by using computer-controlled input-output devices

Virtual performance

An experience with which the participant can interact and create the performance's plot.

Actually the participant is spectator and actor at the same time.

VE's

Virtual Environment's performance.

VEs

Virtual Environment performances.

ABSTRACT

The virtual performance is a form of art that simultaneously develops with information technology, as IT provides the flexibility to develop sophisticated design systems for the artist. Moreover, the intrinsic relationship between art and technology is apparent from the concluding research results.

This research aimed to investigate the aesthetical value of VEs performances.

The purpose of the study was to confront the location of aesthetics in VEs. The qualitative method was employed due to the attempt to control the investigated objective.

Literature review was employed due to the necessity to understand the VEs aesthetic phenomena in their entirety for developing a complete picture of the research field. Case studies and observation were mainly used because of the type of research conducted. The resulting findings were taken into consideration or rejected through interviews with creators of virtual performances.

The research took place in three stages. The first step was to determine the research aims and objectives. The second, was to design the research plan which was divided along three basic axes. The first refers to the historical review and development of visual arts in order to determine the characteristics of the investigated art form.

The second axis was the comprehension of the aesthetics that are produced via the determined characteristics. More specifically, these are interactivity, the interrupted flow of information and the audience participation.

The third stage was the attempt to identify the elements that characterise a virtual performance. How the artist can handle the interactive element and create conditions of immersion for his audience.

The manifesto of virtual performances was created through the course of research and the analysis of the findings that belong to the third stage, which also includes the data analysis.

Another element that also emerged was of the audience's interaction with the performance's development. This element, is in itself a product of aesthetics that has a great influence on the progression of the thought processes of the audiences that interact with a virtual performance. The creator requires a spectator that is an active participant in order to develop the performance's plot. This does not indicate that the creator can manipulate the audience as a tool because each spectator has his own thoughts and critical evaluations. The spectator simply handles and combines according to his choices the elements that the artist offers so that he can project and co-create the performance's plot.

The more the spectator experiences virtual performances through his interaction, the more he will gain knowledge and freedom which will result in virtual performances to offer a larger selection and more powerful experiences.

Besides, this art form is still in its embryonic stage and its maturity promises even greater developments.

C O N T E N T S

SECTION ONE

1. Introduction	4
1.1 Section two	6
1.2 Section three	7
1.3 Section four	9
2. Methodology	11
Introduction	11
Position Statement	11

SECTION ONE

1. INTRODUCTION

It was very strange, I was asleep and I dreamt that I could do anything. I could create whatever I wished... or was I in a virtual environment? Can this dream materialize today in the virtual environment? What are the factors that allow us to live experiences that are irrelevant to the laws of nature? Can these conditions be a form of art?

The art form investigated is an art form that uses the virtual environment as a medium. Virtual environment systems have attracted extensive attention in recent years when virtual reality systems first emerged as a technical tool, and are now being used by the art community.

The computer is a vital part of our lives to day. For the modern creator it plays the part of a multi-tool as it has the ability to produce and process sound and image.

The computer, as a tool, is responsible for transmitting information. Information is transmitted in an optic-acoustical manner and therefore artist's roles are becoming more demanding. The artist is not limited to the static approach of his work. He needs to approach time and space in response to movement. He is also obliged to be knowledgeable on various technological innovations as the artists' knowledge constantly evolves and dramatic changes daily occur in the area of technology.

Thus mankind experiences the transition from nature to the electronic environment. Human groups such as artists, programmers, hackers and video-game users have already started to experiment and investigate this new creative field that is available to them. Artists find themselves at the brink of an era of creation and expression which is the digital age.

This investigation aims to identify the aesthetic dimension of an art form that employs Virtual Environments.

Means of communication, expression and behaviour are changing. Modifications are also noted in thought structures as well as the confrontation of political and social influences of the citizen that experiences cyberspace.

Biologists, psychologists, scientists and social factors determine the basis of the aesthetic results produced by the artist. These are the most important components that influence the aesthetics of art today.

Virtual Environments are media of creativity that must be well known to the artist in order for them to be handled with ease. Likewise the traditional artist is firstly acquainted with the basic characteristics of his materials (paper, canvas, stone, etc.) and then proceeds to the creation of his work. Creators must be liberated at first, feeling at ease and friendly towards the digital medium. He must be familiar with the "virtual stage" that replaces the theatrical stage or the cinema screen thus creating his own space in the CAVE. A new dimension emerges that allows the spectator to become a participant (metaphorically in the beginning) and to be immersed. This has been various artists' ultimate aim since the emergence of art.

A work of art is evaluated by the aesthetic result presented. Therefore through the careful observation of performances created in virtual environments, elements are depicted that formulate the main theory of this study: It is an art form that presents notable aesthetic results.

The limited use of this art form, due to its embryonic stage, does not allow a concrete conclusion to be drawn that would be indisputable regarding how this emerging art form could influence aesthetics in general. Therefore it has to be limited to the formulation of answers for relevant questions.

What has changed is the basic finding of the study presented in section 2. The spectator's point of view has changed. Till today the spectator had the performance in front of him -- this has changed. Now the spectator finds himself on the stage and participates in the action. The viewpoint is on the stage and surrounds the spectator.

The actor's presence is eliminated as the spectator, with the element of interactivity, takes on himself the actor's role.

This study attempts to present artist's thought processes and activities together with interactive media and systems. It also attempts to present the most basic elements of images that determine what the spectator sees and how the artist transmits his message.

Moreover the study faces the visual creation in the virtual environment as the utmost important cultural experience and survival of aesthetics in the 21st century.

Does the language of art created in the virtual environment have common grounds with forms of art specified by the term 'visual'? Most elements are common. In other words, the creation of the space, the use of colour and movement are elements that are still approached in the same way. The confrontation of most situations is the same. Since then, little has changed with regards to simeology despite the use of more modern means.

1.1 Section Two

The second section presents the background of the new art form. It highlights the continuity of the VEs performance with traditional art expressions that stem from the distant past.

A flashback is conducted in the history of art attempting to determine the origins of the virtual performance. The above facts assist in the documentation of the claim that it is a form of art that does not differ from the aesthetic values of traditional art forms.

Each artistic period has its own morphological characteristics that produce its aesthetical values. These characteristics open the way for future expressions of art. A type of continuation can be noted between the aesthetics of traditional art forms and the art that emerges in the VEs. By studying a new art form, as for example virtual presentations, similarities with previous art forms are easily found. Either as a result of direct instruction, or simply as an influence, this is the phenomenon of '*selective relationships*' as referred to by Mourellos (1985, pp.147).

Answers are also provided to the question: '*What is the position of computer art in conjunction to traditional art*' Vince, (1992, pp.152).

It is a balanced relationship and artist's responses remain unchanged. The only changeable elements are the tools used such as, interactivity and non-linear narration.

The new form of art that develops in the virtual environment evolves from the marionette, animation, cinema and videoart.

Bela Balazs (1978, pp.70) states that the cinema is the first and only art form that emerged from capitalism, a fact that forces it to accept a variety of influences.

An opinion formed during this research, is that in order for an artist to create a work in the virtual environment, it is necessary to refer to the philosophy of theatre and 3D animation that surrounds its approach.

3D modeling, and computer animation is the transition of the cinema and cartoons from the 2D to the 3D environment. With the assistance and development of technology, this art form enters into the virtual environment. Traditional film evolves into video or digital recording material.

It has been investigated that the marionette theatre is philosophically closer to the art that develops in the virtual environment today.

This occurs due to the fact that the virtual environment replaces actors with models created by digital technology, an up to date development of the marionette. Marionettes were always controlled by people whereas actors can be autonomous.

In this section, Henri Gouthier's statement is recalled and Gordon Craig's prediction is verified. It is shown that the development of the marionette theatre in 3D animation is the fore-bearer of the new art form that emerges in the virtual environment.

The main characteristics of this new art form are identified (interactivity, personal equation etc.) together with the ways in which they are used by artists experimenting in VEs in order to create art. At this point, elements emerge that indicate how advanced the new art form really is.

There is nothing more difficult than determining the common characteristics that distinguish an era's style and express the aesthetical and morphological map from a sociological point of view. Therefore, the similar elements that exist in virtual presentations, compose an art form which is in its initial stages and whose full potential has not yet been presented.

1.2 Section Three

The third section provides a description of the international aesthetical situation that has been

experienced and influenced in the past and present. It also investigates the way in which digital technology affects global aesthetical values.

From the emergence of art forms, the senses used in presentations were hearing and sight. At times, unsuccessful efforts were made to involve the other senses. Until today, sight was the sense that played the primary role in the perception of a work of art –‘visual communication’. Progressively sound and music was also added. Today with the assistance of technology, touch (sensory gloves) is also used and most recently scent.

This new art form is still in its embryonic stages and accurate conclusions cannot be drawn regarding its aesthetics. However an attempt will be made to broach the subject from the visual point of view.

As this new art expression is a continuation of the theatre and cinema it *‘includes and merges other forms of art’*. Wollen, (1969, pp.10). All art forms involved do not use the same means of expression. Even though all participating forms of art do not use the same means of communication, they do have a common ground: the medium through which they are produced is technology and more specifically digital technology that has begun to form digital aesthetics.

At this point, the role played by the general sociol-political sphere through which a work of art is created and developed in the virtual environment must be noted. As Adolfo Vazquez (1973, p.112) states, *‘in some ways, every society reflects the art it deserves. Firstly because the society itself encourages or endures it and secondly because artists, as members of that society, create according to their unique relationship with that community...’*

Another important finding emerges in the area of politics in relationship with media. The social role of media is changing. In the past, a reciprocal relationship with the public did not exist. Their entrance into the virtual environment has urged the spectator to participate in the performance resulting in the awakening of the masses that have begun to think and become more active members of society. The social reality in which the artist lives, economical data and the statutory framework determine and develop his choice of expression. Not only artists themselves but also the means of expression used in the creation of art, formulate the philosophical approach towards aesthetics that is produced in the digital area of the virtual environment.

People today usually spend most of their time in a room. Contemporary man has distanced himself from nature. This is one of the most important changes of our time and that will be a general phenomenon in the near future. Whether this is a positive or negative fact is not examined here. The only issue verified, is mankind's withdrawal from nature and that this factor affects the development of this century's aesthetics.

1.3 Section Four

The fourth section examines the manner in which VEs performances must be implemented. It does not compose a guide for the artist. This has already been attempted in books and published studies or papers even though the author does not believe in the formulation of rules. Rules are made to be broken, as the primary factor is the artists' personality.

With the emergence of digital technology the importance of the tools used must also be added. In traditional art expressions this was considered to be a secondary factor. The distinct and primary role of the medium's use is apparent in the aesthetic results. How powerful is the medium? What are its drawbacks? How can these drawbacks influence the aesthetic results of artistic attempts?

This is the big problem faced by creators dealing with the 3D environment: the machine's limitations. As every kind of material (water-paint, oil paint, collage, etc.) used by the artist to express himself has its limits, likewise the computer also has its limitations. These limits however have proven useful to the aesthetic result, as they hinder creators ability to present only a photographic portrayal of their ideas. This fact is proven in this section to be hardly accurate, as there are other means that can produce the same results.

Information is presented with regards to the area in which the virtual performance is experienced (CAVE).

The virtual environment is a medium that might possibly replace the traditional classroom in the near future. It has already emerged in the medical field and will daily find more applications in science and entertainment.

The aim of this study is to determine the way in which artists think and act whilst creating

their works. These works are addressed to the users of virtual environments.

The virtual environment provides the user with the ability to take part in an advanced electronic game and to create his own fantasy-world in order that through this experience he will be educated, entertained or simply work.

The ambition of this study is to deal with the image and not with the technology behind it (hardware, software).

Through this investigation, art was sought through its applications in the virtual environment.

2. METHODOLOGY

INTRODUCTION

16 years of animation production and 10 years of teaching lead my current work that focuses on an examination of the argument that Virtual Reality can be the medium for developing an art form with high aesthetical results. This is a development of ideas first formulated in my browsing period discussing with my supervisors and the intriguing question of John Vince posed in his book, *Computer Graphics "Concerns for the location of computer art in the established hierarchy of traditional art"* Vince J., (1992, pp.152).

POSITION STATEMENT

The use of virtual environments is expanding. In the last 10 years, such diverse fields such as architecture, geological and army surveys, telecommunications, medicine and financial exchanges have all begun developing the modelling power of Virtual Reality for commercial or scientific use and art expression. At the same time, the hardware support of Virtual Environments is improving, falling in price and becoming more widely accessible.

However, Virtual Reality design is still not sufficiently developed in order to provide coherent interactive environments between humans of high aesthetical results. But what is the Virtual Environment's role in this aesthetic influence? The drive is to develop coherent practices for the development of such environments. Applications and markets are foreseen in entertainment, training, education and therapy.

'Drama and its development through Virtual Environments is the basic ingredient in the attainment of a virtual performance of high aesthetic criteria' as documented in her research Laurel B., (1993). A question that must be faced is what are those elements that compose a virtual performance?

Translated from the Greek word, *drama* means "action" -a theatrical performance (*theatron*) is "the seeing place". The theatre is the area in which the performance takes place. In the virtual environment, this area is the 'CAVE'. A searching question therefore would be to detect the manner in which a performance takes effect in the CAVE in comparison to the traditional way in which a performance takes place in the theatre or the digital environment

that appears on the computer screen. In other words, in which ways do creators achieve immersion in the Virtual Environment?

As a result, immersion and action must be investigated separately. The aim is to comprehend the ways in which the user interacts in comparison to the spectator of a traditional performance. It must be noted that traditional performances mainly have a linear interaction as in a book or film.

A VE performance might appear to be the natural successor of the cinema, as cinema appeared to be the successor of the theatre. Performances are also pertinent to digital art performances in virtual environments. Many questions have been raised by specialists in this field as to whether this art form is really art or simply a copy of ideas and models borrowed from other conventional art forms. Questions have been even raised regarding how accurate a representation should be when created in the Virtual Environment.

Interactive technologies are based on branching selections of pre-recorded material and animation on film and video editing principles –the “interactive movie”. However, virtual reality offers a medium that does not require or respond to the linear constraints of the cinema. Is this the only difference between the traditional form of this performance and its successor?

The theatre itself and the aesthetic criterion offer a wealth of theory of over 2500 years. Examples in the experience of constructing performances must be studied as an experience for a VR drama construction, the experience of traditional art.

Qualitative Study.

The qualitative research method was employed in an attempt to control the study field (immersive VEs performances). The three traditional forms of this type of research are:

1. The problems and concerns of the researcher.
2. The nature of the knowledge.
3. The relationship between the researcher and the subject matter. The present research emphasizes the socially constructed nature of VE art, the close relationship between the researcher (animator, art director) and the study object (animated performances) and the context that influences the research.

More emphasis is placed on description and discovery via observation (that is an art form) and less emphasis on hypothesis testing and verification. The present research intends to investigate human hi-tech artistic phenomena, such as art created in VEs.

The first approach of the researcher (literature review) was to understand VE's phenomena in their entire for developing a complete picture of the research field. The second step was the inductive approach that began with specific observation (immersive art forms in VEs) in order to develop general patterns emerging from case studies. By the naturalistic approach, the researcher attempted to understand, in a more comprehensive manner, the performance art phenomena.

The selective method of research was Ethnographic. The naturalistic-ethnographic approach includes naturalistic and field research and observation of the artists' art expression in VE's. The researcher attempted to capture and understand specific aspects of the artists' group actions involved in VEs by observing their artistic results (artworks). The focus was on obtaining full and detailed descriptions from artists (via interviews) and their creations.

As a researcher –ethnographer, the author was initially introduced to VEs through literature research and observation, prolonging the moment of introduction to the area of artistic creation which was of more interest to the author from the research point of view. Simultaneously, the author tried to keep as much distance as possible from the subject-matter, aiming at objective conclusions that resulted from the findings analysis and to not consider anything as given facts.

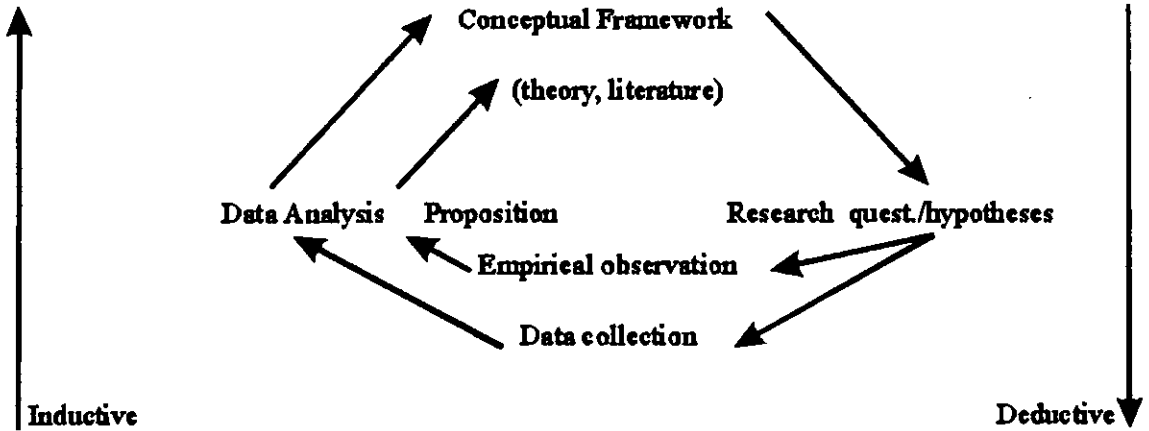
Qualitative data is usually reduced to themes or categories and subjectively evaluated. The data that emerged from ethnographic research started to be reduced in meaningful ways into the thesis.

The constant comparative analysing method systematically codes data into as many themes and meaningful categories as possible. As the categories emerged and were refined, the researcher began to consider how they related to one another and what were the theoretical implications. The theoretical facts of these meaning categories gradually formed a model.

Structure of the Research Methodology Plan

AIM Confrontation of the location of aesthetics into the VEs.	DEPENDANT / INDEPENDENT VARIABLE Aesthetics Social/political/ formulation technological circumstances	Conclusions and Recommendations
HYPOTHESES The VE's medium produces a new art form. (The evolution of cinema and animation art to the new art from which appears in VEs)	TOOLS Literature review/observation/interviews	
PROBLEM I nvestigate, discover and define the aesthetic evolution that depends on digital technology / Characteristics of VEs performances.	SAMPLE <ul style="list-style-type: none">• Artists who are involved with digital art expression.• VEs performances.	
Collection, Evaluation and Data Analysis		

Research wheel is the selected research process.



The researcher started from **empirical observation**, and selected the possible topics: Virtual Environment as an Art form medium (the question of Aesthetics).

The proposition had been formulated during the elaboration process of inductive logic (hunches, beliefs and thoughts). It argued that an advanced art form could internationally influence the future aesthetical situation. Basic assumptions that formulated the proposition depended on the target and goals of the research and needed to be further analyzed.

The developed proposition is expressed as a statement of an established relationship, it's the **conceptual framework**: The appearance of art expression in VE is an Art form. How advanced is this art form? What are the characteristics of the new art form that appears? Literature and theoretical field research had been involved, based on an analysis of historical data on art evolution. These grounded the theory that the new art form is a successor of the traditional performing arts.

Research Hypotheses: The VE's medium produces a new art form. (Is the evolution of cinema and animation art related to the new art that appears in VEs?).

Research Questions:

1. How advanced is the art form? What is its background and history?

- 1.1 Circumstances under which media standards were developed/adopted? The chronicle?
- 1.2 Role played by art internationally.
- 1.3 Context at the time. Social, economical/technological and political.
- 1.4 Context now. Social, economical and political.
- 1.5 Is it similar to other art forms?
- 1.6 The innovation's key components.
- 1.7 Demands for the successful implementation of this art form.
- 1.8 The interactivity role of a VEs performance.

2. How artists explored media through the ages

- 2.1 Process of development.
- 2.2 Motivation and incentives.
- 2.3 The question of picture fidelity.
- 2.4 How artists use media.

3. How artists explore VEs, what are they and how do they work?

- 3.1 What are VEs?
- 3.2 How do they work?
- 3.3 Process of development
- 3.4 Motivation and incentives

4. How artists are using VEs

- 4.1 Motivation and incentives
- 4.2 Were decisions pragmatic, to do it better?
- 4.3 Were decisions strategic, to gain advantages?

4.5 Were decisions inherent, what is the next step?

4.6 What expectations were raised?

5. Characteristics and the aesthetic orientation of the new art form

5.1 Initial perception of how standards were to be used in VEs performance

5.2 Initial perception of the complexity levels of standards used

5.3 Initial perception of the demand on artists' skills and capabilities

6. Characteristics, orientation of users.

6.1 Initial perception of how standards were to be used in VE's performance

6.2 Initial perception of the complexity levels of standards used

6.3 Initial perception of the demand on user skills and capabilities

6.4 What expectations were raised?

• **Research approach.** **Ethnography** is used because it is a direct observation of the small group of artists involved in digital arts and more specifically in Virtual Immersive Environments.

This method was selected in order to identify the conception and formulation of the new art forms' characteristics. Moreover, it assisted the author in discovering any possible problems that might arise such as the aesthetical nature of the art performances.

This research method approached the subject from the "*heart of the matter*". As an ethnologist I can fulfil various roles in my research, such as that of observer and data analyst.

• **Sample.** The sample was divided into two parts. The first part included the participant's opinions and thoughts on virtual performances. The sample consisted of those involved with the Virtual Environment and experimental experts on the phenomenon being studied. Due to the limited number of artists involved in this field, the sample could not be randomly drawn. The participants were selected according to their performance results in using the Virtual Immersive Environments as a means of expression and thus contributing to the evolving study (ARS Electronica Prix).

The necessary research sources are international production companies, universities and relevant research institutions. The research was conducted through interviews with artists

and producers that deal with virtual immersive environments which are at least aesthetically based on 3D modelling, animation and interaction.

The experience of published and unpublished results, collected by an artist during the creation of a work of art, are of vital importance in order to derive legitimate results. Internet web sites provided directions and assisted in communicating with creators and research institutes (Banff, Imagina, F.A.B.R.I.CATORS, Ars Electronica, etc.,) as large distances made contact otherwise impossible.

The second part included the study and observation of artists' self-expression performances. Case studies were used by the author, due to the nature of the study even though they produced a poor basis of generalization, '*case-study research is not sampling research*' Stake, (1995, pp.4). This was done as the author required to locate elements that characterize a performance created in the virtual environment. Certain creation or construction problems / responses came up several times. Therefore, certain generalizations had been drawn concerning VEs performances. Increasingly the generalization was refined, not creating a new generalization but a modified one. The real business of investigating this case study considers that Virtual Immersive Environments cannot compose a simple generalization, as much as the nature of this research allows, as the subject matter investigated, is an artistic expression that does not have regulations or points of reference. The researcher chose a particular case (performance) and became familiar with it in order to produce concrete conclusions.

• **Tools.** Three elements were taken into consideration while selecting the research tools to be used:

- a. If they were appropriate tools with regards to the sample and research aim.
- b. Information on measurements characteristics.
- c. Information on the administration of scales.

The research design will commence with a bibliographical research on art matters, the virtual environment and also on the definition of the term 'Virtual Environments' and the fields' general aesthetic influences.

The choice to commence from the above point of reference was selected in order to be informed on current issues related to the virtual environment and also to discover new facts regarding art and aesthetical phenomena.

Furthermore, lectures were attended and production sites and art exhibitions were visited that used virtual immersive environments as a medium of a form of art expression. The author then proceeded with the design of the questionnaire's structure.

The first step was to support the use of observation and literature review tools. Literature review provided the researcher with supporting data and that could compose the research's foundation. Moreover, it was used to provide a deeper knowledge of VEs and to decipher interviews with artists that deal with the subject of this research. (Secondary data analysis)

- **Observation.** This is a technique that can often reveal characteristics of groups or individuals that would have been impossible to discover by other media (primary data). Such are the production difficulties of a work of art created in the Virtual Environment. A major difficulty for anyone that both observes and participates in this process, is that familiarity with the environment and with the characteristics of colleagues who are being observed may affect objectivity. The repetition of observations and interviews provided the required objectivity of results. Together with the frequent revision of the author's opinions, the final conclusion was reached.

- **Case study.** The study mainly is observational due to the type of research conducted. The observation data was acquired from case studies.

More specifically, the main observational results came from case studies such as the performances, Mitologies and Robots + Avatars dealing with Virtual Illusions and KALI, The Goddess of the Millenium. Performances were presented by the Hellenic Foundation such as Ancient Militos or Greek Traditional Costumes. These performances were used in order to suggest and reinforce conclusions presented following the study of these case studies.

The performances' selective criteria were:

A. The above mentioned performances are of great interest as they are characterized by non linear narration, interactivity and the user's full participation with the properties of the actor. In the following sections, the interrelationship between these elements and the creation of aesthetics will be supported.

B. The performance Robots + Avatars is also selected for another reason, its ability to be also be experienced via the Internet. This is an interesting element with regards to the development in presenting performing arts. **Ghostcatching** (Ars Electronica 1999)¹, a virtual choreography created by digital artists in collaboration with a dancer/choreographer. Captured phases become the building blocks for the virtual composition.

- The main case study relied on:

CASE STUDY No. One

Mitologies, (1998) Concept by: Hisham Bizri and Maria Roussos

Description of the experience *Mitologies* is a virtual reality performance created for the CAVE. It is loosely based on the Cretan myth of the Minotaur, the revelation of St. John, Dante's "Inferno", Durer's woodcuts after the revelation, and Borges' Library of Babel. The connections between these sources are central to the unfolding of the narrative. *The title Mitologies* is derived from the Greek word "mitos," the thread Ariadne gave Theseus to help him find his way out of the Cretan labyrinth.

CASE STUDY No. Two

Robots and Avatars dealing with Virtual Illusions A Project by Franz Fischnaller - F.A.B.R.I.CATORS / Milan / Italy in collaboration with: K-Team, Lausanne/Switzerland Copyright: Franz Fischnaller 1998

The event will show a sort of "real" world in which one (or two) robot(s) live(s). The robots move just like they were living inside that "real" world, but their actions are strictly related to a Virtual Reality ambience. The spectators not only interact with this world by deciding which places the robot has to reach, but also can interact with it by the means of a light source. Flashing it could in fact produce instinctive reactions such as fear or aggression. At the same time the Virtual worlds and the virtual actions can interpret these events (the light and reaction) with the reproduction of special images or effects.

CASE STUDY No. Three

KALI The Goddess of the Millennium: An ad hoc production for The Berliner Festspiele GmbH (Germany). Exhibition: "*Seven Hills. Images and Signs of the 21st Century*"

Martin-Gropius-Bau Berlin, 14 May - 29 October 2000

Copyright: Franz Fischnaller 2000 Milan (Italy).

An interactive sculpture of 2metres (eyes level 1.75mts) stands on the top of a hill, immersed in a play of shadows. Three steps lead me to her. A retro projection screen lies at her right foot. Two retro projection screens of 3meters x 2.25meters each are placed on Kali's right and left sides, separated within each other by a glass wall of 225cm. Kali's event is materialised by Kali's inner world, (it is the virtual world, the world of causes and decision making). Kali's external world is the world of the effects, generated by the participant who is interacting within the virtual worlds.

- **Interviews.** these are often seen as techniques of vital importance in small scale research. Interviews were used due to the major advantage of their adaptability.

It is a source that produced data for supporting the case study observations. Questions of reliability and validity are posed differently in these settings because these interviews served to focus discussion between the researcher and participant, producing data that was more textual than numerical. The interview format used is a semi-structure one, because it should be as flexible as possible. Some questions were prepared in advance, although the precise wording of them vary from time to time according to the participant's experience and his involvement in the VE. The interviews must be individually based.

A skilful interviewer can follow up ideas, probe responses and investigate motives and feelings, which the questionnaire can never do. In using this tool problems naturally appeared, such as some artists were not in the position to discuss the subject. For example, during an interview with Maria Roussos she was unable to answer as to how she reacted to the structure of the work *Mitologies*. She seemed rather embarrassed and requested the author to examine the performance herself.

Similar occurrences surfaced on numerous occasions. The author often had to return and reopen the discussion in order to draw out the answers and formulate her position on the matter under investigation.

The interviewer was only able to interview a relatively small number of people. Analyzing responses presented difficulties, and wording the questions was a demanding procedure. Even so, the interviews yielded ample material.

Qualitative research and open-ended questions, allowed the subjects examined (in this case artists involved in the virtual environment) to provide their own descriptions and interpretations, by using their own notional and conceptual assumptions and not those specified by a strictly structured questionnaire.

The subject questioned was called upon to express an artistic view in his own way and to develop an issue from a completely different viewpoint than another subject.

Despite the attention paid in the compilation of the interviews, problems always arose. Due to this fact, the researcher had carried out a trial research in order to pinpoint these problems at the earliest possible stage.

• **Data collection.** In order to collect data the author summarized the information in the form of memos and reflective notes. Procedures adapted from Moustakas (1994, p.122) were also followed. A very important issue is data codification, achieved by adapted Strauss and Corbin's (1998) procedures, such as, open coding, axial coding and selective coding. Reliability was achieved by the replication of the study under the same conditions. This method was used on the art performances that were studied and some participants were re-interviewed. Internal validity confirms facts on study reliability of a causal inference. Participants debriefing, recorded data and taping interviews are some methods that had been used for the credibility of the study. Adequacy was achieved when enough data had been obtained so that the previously collected data had been confirmed and understood. When the information was sampled and chosen purposefully rather than randomly, to meet the theoretical needs of the study, the author met the appropriateness criterion. Most helpful was the record of the study process because the data were in order and easily analyzed. Furthermore with this analysis, information and ideas were easily synthesized. Triangulation was also achieved by literature research, with different sources that included additional participants, other methodologies and different data.

• **Data analysis.** Following the data collection, its evaluation and analysis commenced. The next step was to deal with the recording of results. The above procedure was repeated, in some parts several times, in order to achieve unbiased results.

Interviews and conversations were conducted with artists that had relevant producing and artistic experience of 3D animation performances. This proves that the analyst comprehends and analyses evidence more accurately than someone not familiar with this field.

• **The objective** of this study is to define the needs that arise during the production phase of a computer-derived performance on high aesthetical values and to provide the elements in order to deal with these needs. The observation results do not aim at compiling a type of manual for artists that are involved with VEs, but to define the design and development philosophy behind a VE performance. The aforementioned results had been gathered from the researcher's own data, collected throughout her career as an artist in the area of animation since 1984 and from observation. The next step was to deal with the recording of the results.

The capabilities required by a researcher of such a study, is to be well acquainted in the areas of animation and the virtual environment and their production with a high aesthetical value.

Access is not an easy matter as there is no plethora of information in the area of the virtual environment and therefore information is also derived from the 3D sector.

By this research the author hopes to discover and master the deficiencies of traditional artists in order for them to be able to produce art in the virtual environment. Also the new art form has been proved to be an aesthetically advanced one. Thus, artists will attain higher qualitative results in performances. Through this research the need might arise for the two teams to work together in some areas (artists, software designers and users).

This study is valid as the sample is relatively large (the majority of internationally known artists). The findings are supported by bibliographical research and interviews with people of the art world and the virtual environment.

The results of lengthy observation as an animation producer and instructor have provided the author with a motive to contemplate aesthetical and philosophical aspects of the virtual environment.

The literature research, as a consequence of this observation, verified the author's previously formed opinions. New factors were added that were not previously taken into consideration and that urged new research aims. Findings and their analysis assisted in the completion of this study. The interviews were of vital help. The exchange of views with creators presented new elements that in turn completed the puzzle of this research.

This study is addressed to artists that wish to deal with the virtual environment and 2D & 3D animators. It might also be helpful to information technology students and whoever is interested with the aesthetic side of virtual environments.

The research will result in an informative study for artists being introduced to the Virtual Environment.

The aesthetical philosophy can be applied through the digital environment. The necessity for art will invade everyday life as contact with the virtual world will be a constant occurrence, either in the form of entertainment, education or science.

It is steadily gaining ground and is used in an increasing number of applications.

C O N T E N T S

SECTION TWO

1. Introduction	25
2. Historical Review of Visual Arts	25
2.1 Immersion	25
2.2 Mediums of Visual communication	26
2.2.1 Oil Paint	27
2.2.2 Photography	27
2.2.3 Cinema	28
2.2.4 Performing Arts	29
3. Historical Developments of Visual Arts	30
3.1 Technology and Virtual Environment	30
3.2 Art and the Audience	32
3.2.1 Video Art	33
3.3 The Audiences' Interaction with the Performance	34
3.3.1 Multimedia	34
3.3.2 Cyberspace	35
3.3.3 The computer as an art tool	36
3.3.4 Birth of virtual reality	37
3.3.5 Experimentation	37
3.3.6 Interaction and simulation	40
4. The Performance's Non Linear Narration	42
5. Virtual Performances and Devices	43
6. Virtual Performances – Art or Technology?	44
7. Virtual Environment	46
7.1 CAVE	46
7.2 Activity	48
7.3 Identification	49
7.4 VEs Art	52
7.4.1 How Fluxus influenced VEs art	52
7.4.2 The autonomy of art in the V.E.	54
7.4.3 Cinema, theatre, video, painting, dance or sculpture?	56
7.4.4 The Cross Cultural Phenomenon and its Role in Art	60
8. Conclusions	61

SECTION TWO

(Digital Performance)

Are VE performances the result of art or technology?

1. INTRODUCTION

This section attempts to reach results regarding the origins and nature of performances created in the virtual environment. This attempt is the outcome of literature research that describes its historical developments. The reader can be informed of art visionaries and their experimentations that contribute to the creation of virtual performances.

Characteristics have been noted and developed which maintain that such performances are an advanced art form. Most of these characteristics such as interaction and non-linear narration, have already been substantiated and expanded by major researchers of virtual reality, such as Brenda Laurel (1999) and Morse (1998). This study concludes with the third characteristic –the elimination of the artist's presence as traditionally determined. This elimination causes a major cultural and aesthetical issue. Together with the above characteristics, it substantially contributes to the argument that a virtual performance is art and moreover of high aesthetical value.

Furthermore, the nature of virtual reality is also determined as well as its role in relationship to virtual presentations.

2. HISTORICAL REVIEW OF VISUAL ARTS

In this section, the research conclusions are stated with regards to the background of this phenomenon. This historical review is important as the nature of this study's objective should be fully understood and analyzed. If possible, its boundaries will also be defined.

2.1 Immersion

Art emerged from the moment that man decided to express his feelings via activities that causes aesthetic results. Therefore, the artist's aim is to express himself and to achieve, on behalf of the spectator, the sensation of total immersion. This means that the spectator occasionally identifies with the artist's emotions as he experiences the same feelings



Dordogne, Northern France

and conditions and is totally immersed in the artificial world presented by the performance. However, this artificial world stems from the creators' actual inner world.

At the start of civilization, the 2D and immobile image was the tool that artists utilized in order to express themselves and to communicate with their audience. In 15,000 B.C, cavemen in Dordogne, Northern France, drew scenes from hunting expeditions. The figures of depicted animals were coded with the term Shamanist scrawls and according to Cro Magnon, this marked the birth of aesthetics (cited in Arneheim, 1974, pp.25).

Later on, Egyptian art was found on pyramid walls that portrayed in detail scenes from the Egyptian everyday life. In this manner, they believed that simulated conditions of earthly life, would be created for the dead (mummies), even though the deceased had long left this world. If these frescos are studied carefully, one can notice the artist's effort to relate a story as accurately as possible. More specifically, they present a scene with a detailed design position and movement,



Egyptian Art

something like a storyboard This can be considered to be the first endeavour to analyze movement and to animate designs. This concept was realized much later with the technique of art animation, more commonly known as cartoons.

Over the centuries, many attempts were made to discover the techniques and media that would achieve the spectator's successful immersion into a work of art. Philosophers and creators observed that the desired immersion was achieved with the stimulation of the senses. They attempted to discover means of expression that would successfully communicate with their spectators and allow them to become totally immersed into their work.

2.2 Media of Visual Communication

With regards to the visual arts, initially oil painting and subsequently colour photography could reproduce the colour, texture and tangibility of objects. This is accomplished with the stimulation of sight.

2.2.1 Oil Paint

The invention of oil paint as a medium, is the result of the artist's attempts to depict the enjoyment of realism. This becomes more intense by use of oil paints, as it has the ability to render a number of the physical attributes and dimensions of the pictured subject. In the work «The Royal Palace of Neapolis»² Samartsis (1889), the artist through his work managed to present the third dimension and to immerse the spectator in the palace's square. The



The Royal Palace of Neapolis

work's intensity, among others, is due to the aesthetical use of expressive means used by the artist, as for example the technique of oil painting. Oil painting is one of the most realistic techniques that depict an environment. This is probably the only tool of the past that can depict colours with extreme clarity and lustre as well as a scene's accurate reproduction.

2.2.2 Photography

Photography subsequently emerged and offered new expressive abilities owed to its technical attributes. Its main quality is its ability to capture a moment and freeze it. In a similar way to oil paint, it represents the authenticity and tangibility of objects.

The technology of photography permits everyday scenes to be captured including human beings and scenery. The knowledge of this technology was acquired over 180 years ago with the Frenchmen Nieps (1822) and Daguerre (1838) and later on Charles Crau (1880) added to this art form the method of colour photography.

The realistic results achieved by this medium, invites the spectator to identify with the respective photograph's hero. This attribute was later used as a tool for marketing consumable goods.

In the photograph «*The Leggy Look of Life*»³ Life, (1969, pp.137) the combination of the girl's short skirt, long coiffeured hair and sun glasses composed the female model that some women wished to look like. Thus, through the process of identification, the fashion and aesthetics of that period emerged.

2.2.3 Cinema

Traditional means however, restricted the artist's fantasy limits to static images or constructions. Prior to the discovery of the cinema, many successful attempts were made by artists to animate their creations with inventions such as, the magic lantern, the dancscope, zoetrope, etc. However, the revolution actually began with the cinema.

In 1896 the Lumiere brothers invented the cinema and thus provided artists with a new tool for artistic experimentation. The technology of this tool is clearly based on the inertia of the human eye and on the movement of photographs in a certain time (24 pictures per second). It creates a performance in which the artist is not actually present in the projection room. With this technological assistance, the artist's presence is projected on the white screen during a cinematic performance. Thus we have the phenomenon of presence without its actual existence. More specifically, a virtual presentation of space and/or the actor.

A few years later, the manifesto of '*The Futurist Cinema*' as stated by F.T. Marinetti⁴ (1916) determines that the cinema can become the most dynamic means of human expression. It has the ability to utilize all forms of traditional art such as the theatre, music, dance, etc. and with this combination, to present an entirely new entity. With its roots in various different theatrical models, the cinema transforms codes of drama presentation and creates its own independent language. It presents the dramatic structure of narration in a different way to that of the theatre.

- **With the birth of the cinema, the below characteristics emerged:**
 - **The combination of art and technology**
 - **The phenomenon of virtual presence**
 - **The fact that art, together with the input of technology, can combine all visual art forms and borrow elements from the theatre, such as speech.**



Ancient Greek Theatre

2.2.4 Performing Arts

The organized form of drama began in Ancient Greece and its structures are met even today in modern theatre.

Initial presentations served humanitarian purposes. The sociological messages conveyed to the audience during their entertainment also formulated those societies.

Actors, masks, costumes, speech and rhythm were harmonically blended (mimicry) in the works of Aischilos and Sophocles creating a prototype for future theatrical attempts and other theatrical forms such as puppet shows and marionettes.

'There is much to learn from the theatre' Norman D., (1993). More specifically, a great deal of information can be derived from a performance's creation.

Moreover, the term theatre involves the area in which performances are carried out. Kyriakopoulos (1969).⁴

- **The common point of reference between traditional theatrical performances and virtual performances is that they are carried out in a specific area, regardless to whether it is a conventional or virtual space.**

The theatre, as an art form, was established in ancient Greece and was called 'drama' meaning activity. This activity is presented in specially built areas that initially were open-air arenas that finally evolved into magnificent buildings, built according to the style of each era. The characteristic of all these types of theatres is the 'stage' on which the performance is presented and the 'hall' where the audience is seated.

"The theatre survives on conventions" Gouhier (1991). The same occurs in all art forms and is also noticed in the virtual environment. The artists are not interested in presenting their subjects with particular realistic tendencies. They are indifferent to portraying actual everyday life. They aim to create fantasy worlds through conventions that will convince and fully immerse the viewer-participant.

Artists, who were influenced by the evolution of drama, were the ones that conducted experiments in order to animate the immobile 3D image. They also added the 'time' tool and pioneered today's development of computer animation and more specifically, computer-generated performance animation. Brenda Laurel (1999) offered much to this field with research conducted in the field of interface design and 3D performances.

Via the performance, these characteristics, directly or indirectly stimulate the audience's senses of sight, hearing, etc. Performances are probably the spatial means that allow immersion to the highest degree. The three characteristics a performance combines is the art of speech, sound and harmony. Aristotle (1999)

- **A theatrical performance is a valuable source of information and data. These can be borrowed by the creator of virtual performances and then developed and adapted to the needs of a virtual performance.**

3. HISTORICAL DEVELOPMENTS OF VISUAL ARTS

What is a virtual environment?

As with the appearance of the cinema in the beginning of the last century, likewise at the beginning of this century we are immersed into the phenomenon of virtual reality.



VR is a hi-tech delusion

Virtual reality is a hi-technology delusion, a fantasy. It is not only the present, but also the future, with applications in art, science and everyday life.

The most impressive feature of this mean, is the opportunity that it provides to explore 3D spaces. This is achieved by processing data.

3.1 Technology and Virtual Environment

A number of people have a hazy picture of virtual reality. They often compare it to a video game or the cinema. There is a logic behind this impression, as artists use similar tools and technology for visual angles and acoustics. This fact, in other words creation via digital technology, ultimately leads to the world of cyberspace.



Scott Fisher's virtual environment

In 1986, Scott Fisher⁵ and the NASA Ames View (Virtual Interactive Environment Workstation) team lab named this new medium as *virtual environment*. Even though the term virtual reality is more commonly known and used, the pioneers in this field, insist that the term virtual environment is more appropriate. Moreover, from the

scope of this research, the term virtual environment provides a more accurate portrayal of the subject investigated, as it is the active area in which virtual environment presentations are experienced.

During the same period, technological experiments in virtual areas were called Artificial Reality.⁶

'Virtual Reality is produced with the use of computer technology. Thus, Virtual Reality allows the creation of the 3D world and interactive effects, in which objects have a sense of spatial presence' Bryson,S. (2000)

Digital technology offers the opportunity for artists to utilize computer programmes in order to create the desired environment. This is the exact element that stimulates not only the audience but also the artists that are involved with this specific technology. For this reason, the author has named this section 'Digital Art' -the art produced by digital technology. It is a 3D area that includes interactivity between digital graphics. Therefore it includes objects that have a cyberspace presentation and an independent entity from the user and technology.

Alvy Ray Smith (2000)⁷ declares that, *'Reality is nothing but 80 million polygons per second. We can do that now'*.

The fact that this emerging art form uses cyberspace as a form of expression has not been fully developed. It is a new phenomenon that concerns those who work with art and especially aesthetics. It also offers them the opportunity to observe the laws that govern its development since it's appearance.

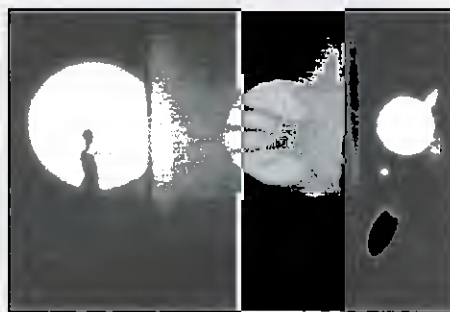
The spectacle offered by the virtual environment is still in its embryonic stages and is composed of narrative expressions that often do not make sense. This occurs due to the fact that creators are still at the experimental phases of its development. In the near future however these expressions will link together and form a narrative entity with a beginning and numerous choices of development and conclusion.

The author attempts to investigate the world of virtual performances and to discover its background and characteristics.

- Therefore, the definition determined at this point, is that the virtual environment is an illusion composed of virtual objects of spatial presence, having an independent existence from the spectator and technology. However, these objects cannot be created without technological input.
- The artist's need to converse with his audience drives him to experiment in ways that will achieve the desirable result of communication.

3.2 Art and the Audience

The transition to the industrial age and the emergence of the cinema as an art form and cultural phenomenon introduced a series of inventions. These compose the medium through which an artistic expression is transmitted to the audience. Furthermore, these tools evolved with technological developments replacing the traditional cinematic camera with the video-camera.



Theatre of Totality

Therefore, experiments with the video-camera can be thought to create a new art form which is even closer to the art that appears in the virtual environment.

Video, as an art expression medium, allows creators to experiment and present their works both in 2D (video narrations) and 3D (video installations) environments.

At this point, it is obvious that the artist must escape from the limitations of two dimensions and also consider the third dimension. This third dimension allows him to provide this creation with an aesthetical value and to incorporate this in his two dimensional

work of art. The need emerges to create a more interesting presentation that is of equal importance to the work's creation. The work's presentation and creation are of equal importance. '*The one part is interrelated to the other*' Lazlo Maholy-Nagy (1992)⁸. These thoughts stated by Maholy-Nagy concerned his constant experimentation to formulate the rules of the abstract visual arts of drawing, photography and sculpture. In 1924, the result of these experiments developed the theatrical form, '*Theatre of Totality*' based on Wagner's idea of total theatre. Maholy-Nagy attempted to combine elements of space, motion, sound and light in order to create a form of abstract art expression. He also dealt with the influence of technology and its aesthetic results on his work.

3.2.1 Video Art

Videoart emerges to assist conceptual art, in other words, the display/action performance. In this display, the artist presents his work only once to the audience and under specific conditions, place and time.

The artist creates the environment and the conditions and the spectator is called upon to freely participate

at any moment he chooses and to formulate as he wishes the flow of this presentation.



Exposition

Contemporary art has already turned towards the construction of sculpture and other structures. Here the artist applies sculpture to painting and stage designing, in order to present his work to the audience. A classic example is Nam June Paik's⁹ exhibition in 1963 at the Parnass gallery titled '*Exposition of Music-Electronic Television*'. Paik randomly positioned 12 monitors on top of each other, upside-down and to the left and right. The monitors projected images, some of which could be altered by the viewer using a microphone or pedal switch. In this exhibition one can note the appearance of multi-media. All art forms operate together, using persuasive mediums that complement each other in order to produce the perfect result, e.g. the art of sculpture (positioning the monitors in the exhibition area) sound, image etc.

The viewers have to circulate through the works and therefore unconsciously become part of its synthesis.

This interaction also appears in the exhibitions of “traditional” modern art forms and challenges the audience to ‘touch’ the work in order to stimulate their senses such as sight, smell, etc.

With this process, the spectators are transformed into participants. One of the most recent happenings that occurred in the area of interactive exhibitions of traditional works was the *Abracadabra*² exhibition at the Tate Gallery, (1999).

- Since the emergence and development of art forms, it has been noted that artists need to create through more integrated forms of expression, e.g. performances that invite the spectator to take on a role of his choice whilst experiencing the performance.

3.3 The Audiences’ Interaction with the Performance

It is obvious that the audience’s participation in a presentation of an artwork, begun with visual arts. Gradually, the audience was called upon to take on an active role in the presentation.

The idea of placing the audience inside an image or performance has been used in the past in field of space simulations. Only in recent years, this technology has been employed for educational and entertainment purposes, such as the ‘Virtual Voyages’¹⁰ which is a fascinating experience of a twenty-minute journey through a science-theme story, that immerses spectators into a comet’s tail as its falls towards earth. The audience can participate in the action, which features sophisticated special effects, panoramic video-wall technology and an aesthetic approach.

Hence, the issue of multimedia emerges –what sometimes occurs is that the more art forms and means used in artistic creation, the greater the spectator’s immersion in the work of art.

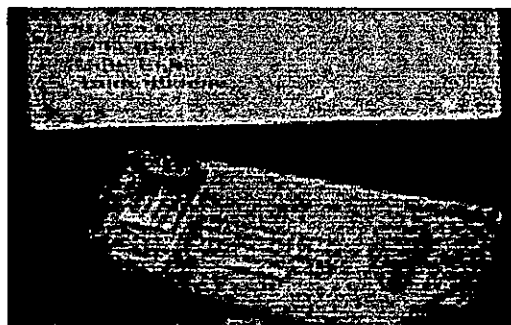
3.3.1 Multimedia

The historical development of the emerging art of multi-media is based on the exact same element; the element of the spectator’s participation that has begun to characterize all forms of artistic expression. Technological developments greatly assist creators and especially important are the developments in the field of personal computers (PC). The ability

provided by computer technology for multimedia productions and experiences in the virtual environment presents a new form of artistic expression that stems from the beginning of the 20th century.

3.3.2 Cyberspace

In 1945, Vannevar Bush¹¹ and Douglas Engelbert¹², designed the first multi-media desktop system 'Memex'. Druckrey, (1994, pp.43). This system, the prototypical hypermedia machine, was the successor of the Differential Analyser. With the opportunity of the discovery of the 'Memex', the *Atlantic Monthly* invited Bush to



Engelbert multi-media desktop

write an article on his invention. The result was to present the remarkable essay '*As we may think*'. An essay that presented the important issue as to how information can be captured, stored and processed.

This article had a profound influence on the development of personal computer and the Internet. Fifteen years ago, the artist that experimented with digital systems produced digital art following continuous research and experimentation. His aim was to fully understand the complicated equipment and his language of communication, in order to create a work of art by using computer technology.

Over the years, the ability of cyberspatial also appears such as tele-presence¹³ experiments, global networks, virtual reality and neural interfaces. The dimensions of the socio-political problem also starts to emerge, leading to radical role changes. This will be further discussed and analyzed in the third section that deals with the new art form's influence on culture.

What is the area and medium in which art forms find a field of expression? The field of expression is cyberspace. The term stems from the Greek word *cybernao* -to govern. A derivative of the verb is *cybernetis* is cyberman, a word that we could actually translate as the pilot (*cybernetis*) -someone that navigates the Internet world. At this point, we are aware of the importance of the viewer-user's participation in the creation derived from the virtual environment. It's '*a symbolic system supported and maintained by machines*' Morse,

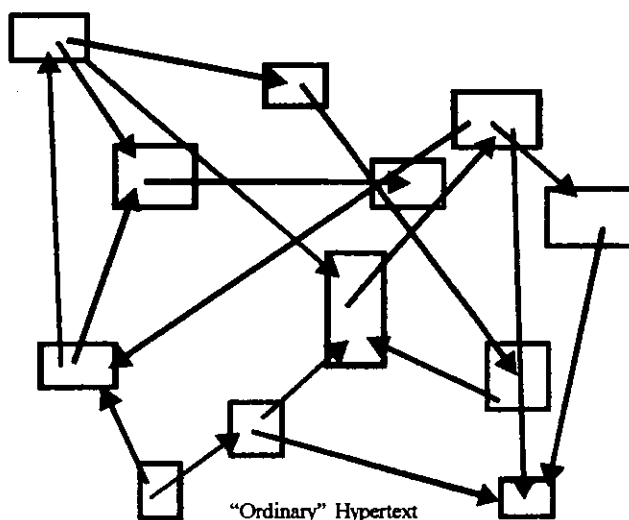
(1998, pp.178). In other words, it is a type of virtual world in which the participant, as a tangible entity, cannot actually be present but can participate and act as a liberated spectral body.

Cyberspace '*contains many kinds of virtual worlds*', Heim, (1998), through which many art forms are presented, namely the media arts; art expressions that are directly affected by the media or expressed by it.

- **Cyberspace is a medium of information transmission and consequently of art. The existence of cyberspace, is based on digital technology and therefore art forms that are transmitted via cyberspace are digital, "Digital Art". This art form is the result of experiments carried out by artists dealing with Contemporary art.**

3.3.3 The computer as an art tool

The next decades of the 50's and 60's developed the computer-based communication (interface design), via the screen, mouse and electronic mail and all those elements that transform the computer into a tool of mass production. Nelson¹⁴, under the influence of Bush's article '*As we may think*' and with Samuel Tay Colebridge's poem '*Xanadou*' (1963), begun his



research aiming at constructing tools that would change the way of reading and writing. In 1963, he introduced the terms '*hypertext and hymermedia*' and described the possibilities of these new tools. It was a critical invention for a system of non-sequential writing, which could allow the header to collect small meaningful portions, according to the user's desire, and not based on pre-established fixed structures stipulated by the author. In 1974, he wrote the manifesto of the multi-media movement.

In the 1970's, G. Youngblood presented his invention the *Expanded Cinema*. It was a processing of a model for the development of a medium involving graphics, film, video,

theatre, music, dance etc. Expanded cinema works and how they influence virtual performances will be presented more analytically.

His attempt in this era was not acknowledged as much as it should have been but the material of his experiments was exhibited in London (1968)¹⁵ and proved invaluable to the relationship between art and computers. This event initialised further experimentation in the field by himself and others. In the same exhibition, G. Youndblood and J. Reichhardt's opinion was presented regarding the development of multimedia that would lead to the vast expansion of multimedia -the mass-media of this century.

3.3.4 The Birth of virtual reality

In 1962, Ivan Sutherland supported the incredible potential of computers, in transforming the abstract nature of mathematical structures into hospitable expressive environments.

Based on this belief, he created the 'Sketchpad' programme. With the creation of this programme, he initialised the communication with computer visualizations and provided the opportunity to design powerful yet small systems that were equipped with a monitor. He also pioneered the way for electronic design. Sutherland had also drawn up the fundamentals of VR in his lectures on '*The Ultimate Display*', (1965). It was a prophetic statement that described the way in which the computer would allow the spectator's entry into the virtual world.

Sutherland in 1968, also created the head-mounted display. This equipment allowed the user to have a left and right optical view, according to where the user glanced, to a scene produced by a computer.

The first images were far from realistic. The stereoscopic forms gave the impression of a solid 3D object. However, this rather insufficient operation, was the birth of virtual reality. The first experiments were carried out for military and simulation purposes.

3.3.5 Experimentation

In 1984, NASA presented another program, in the form of a PR exercise. This exercise included a trip into virtual data environments.



Ultimate Display

In the same year, W. Gibson was inspired with the term '*cyberpunk*'¹⁶ and proceeded to introduce it in his books. He presented a new manner of artistic expression that proved to be a source of inspiration to other creators. Gibson described a future in which humanity was inseparably bound to the virtual world of electronic space. Many consider Gibson to be the founder of the virtual environment.

- It is therefore obvious that multimedia is incorporated into society slowly formulating everyday life and human expectations of the VE's possibilities to influence culture and aesthetics.

According to Myron Krueger (an experienced media artist)¹⁷ between 1962 and 1984, and also between the presentation of 'Sketchpad' and the NASA experiment, artists only experimented and worked on inventions that would boost the idea of virtual reality. Krueger himself, from the beginning of 1963, and in collaboration with artists and engineers, attempted to create works of



Silhouettes

art that responded to the movement of viewer's gestures through an elaborate system of sensory floors, graphic tables and video cameras. Due to his contribution to Interactive computer art, he is also known as a '*composer*' of intelligent real-time computer mediated spaces, or responsive environments, known as Krueger's Composed Environments. An example is 'Videoplace' (1970), a presentation in which the computer responded to user's gestures, through interpreting and anticipating the audience actions. This resulted in users being able to actually touch each other.

Silhouettes that are produced by video, skillfully use a variety of graphic objects and animated organisms which appear on the screen and are saturated with the presence of artificial life.

In 1960 tools were developed that created new design approaches with changes in the operation of available technology. They not only composed prototypes of ordinary contemporary musical instruments but also art machines, such as Mort Heilig's¹⁸ '*Sensorama*', an idea conceived in the 1950s, based on the theory that magnificence of life can be

produced with 'reality machines'. He proposed that an artistic expression would be improved with scientific knowledge of the senses of perception. He had simple thoughts that were fundamental and revolutionary for their times. He believed that if an artist can control the multi-sensory stimulation of participants, he could immerse them into illusionary sensations. With the first user experience of actually '*being there*' he therefore introduced with his work '*Sensorama*' (1962) the idea of a drive with a motorbike through the streets of Brooklyn. This was achieved with the use of film sequences, stereo sound, scents, a wind machine and special effects.

Even the invention of the '*data glove*' is closely related to the machines of the virtual environment developed by artists and creative purposes. Its first appearance is owed to the research of Dan Sardin, Tom Defanti and Gay Sayers, which was supported by a National Endowment for an arts grant.



Sensorama

The data glove of Tom Zimmerman, which was originally used to play his '*air-guitar*', was finally used for NASA's VR development following the conversion made by Scott Fisher¹⁹. The NASA system included an updated version of a helmet-mounted display with stereoscopic images, a very important virtue over the monosonic vision of Ivan Sutherland's earlier device. Fisher added headphones for 3D audio, and a microphone for the effect of speed recognition. This equipment offered the opportunity for virtual reality to rapidly develop in areas such as laboratory research, games industry and media theory.

The multi-sensory interaction with cybernetic devices, designs a strong illusion of an emerging digital space. Wiener argues that the quality of human communication machines influences man's inner being. Therefore, hi-tech machines and their ability to respond satisfactory to the users often have a significant impact on the social system.

Ascott's ²⁰ research began with the concept that interactive art must be free from the fashion ideal of the '*perfect object*'. He also agrees with John Cage, that a work of art must respond to the spectator and not simply be a static and constant creation

In this manner Ascott transferred this operation into the field of computers and introduced the '*Spirit Cybernetics*' as the most effective medium for the successful exchange of ideas between the work and the audience

3.3.6 Interaction and simulation

Interactivity is a technological break-through and not simply a thought process. Simulation and interaction are the basic elements that create the concept of multimedia productions that are applied in areas of education, entertainment and video games. For interaction to materialize, a new form of narration must be used. William Burrough (1959) dealt with construction of language via techniques of cut-up and fold-in. This research was the beginning of the non-linear fragmentary approach to modern narration. He collaborated with the artist Byron Gysin in a research that proved fundamental to the development of contemporary narration. They used principles of the logic behind the collage of visual arts and formulated the method 'link fragments' of texts in surprising juxtapositions. This achievement lead to the rapid development of undiscovered areas and provided the reader with the urge to modify his thought processes. For this exact reason, Burrough refers to himself as a '*map maker, an explorer of physic areas*'. According to his opinion, narration operates as an important multi-threaded network, which reflects mental processes and breaks through the limits of time and space. He paid attention to previously unexplored links and connections between extraneous materials, elements and ideas.

A concept, already projected by Marinetti (1916), is that the *futurist cinema* would free words from the fixed pages of a book and '*smash the boundaries of literature*'. In a similar manner, painting could break away from the limits of a 2D framework.

John Cage²¹ with his work's revolutionary approach, which is characterized with elements of boldness and vagueness, urged creators to further extend the audience's freedom in participating in the performance. This revolutionary discovery establishes the artist as an all-powerful synthesizer of artistic expression. It also proposes a shift towards an interactive art that encourages the interaction between audience, participants and artist-performers.



Household performance

At about the same time, Allan Kaprow²² experimented with the concept of the audience's interaction in the performance. The result of this experiment was referred to with the term *Happening* (1964). It's not easy to describe the term because each event is characterized with unique elements that are generated by the audience's actions that take part in the given performance. For example, the 'Household' (1964) held in natural environments such as abandoned factories, buses, etc. brought together people, objects and events in surprising juxtaposition to one another.

Kaprow comprehended art as the vehicle for expanding the audience's awareness of life. He believed that unexpected and provocative interactions are the ways for this to be achieved and he developed techniques that immediately presented the audience's interaction. These techniques encourage the audience's participation in order to create links between events and ideas based on non-linear narrative structures.

The presentation is a series of events that can be alter space and time. The structure of this narration as solely based on the collaboration between the audience and the artist. This relationship is the pioneer of a non-linear form of digital media that makes use of interactive and network technology in order to expand its limits.

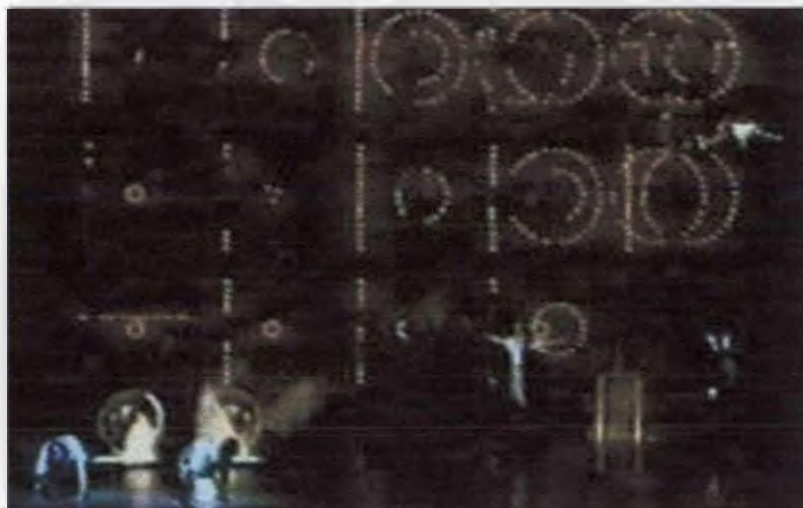
The concept of communication in VEs is based on the communication between the audience and the computer. Norbert Wiener, in 1948 defined the term *cybernetics*, as the science of transmitting messages between man and machine or vice versa. He used this term as it presented ways in which mankind interacted with machines via a controlling device, such as a steering mechanism. The science of transmitting messages, supports the interactivity of man with machines.

- With this brief description, a result of literary research, it is obvious that all forms of art develop through a common path, namely that of multi-media performances. These performances utilise all tools in order to serve the purpose of perfect immersion. The most important tools are interactivity, and non-linear narration. This is achieved with technology and the construction of equipment such as the data-glove or head-mounted display. The development of multi-media created incentives for future literary visions.

4. THE PERFORMANCE'S NON-LINEAR NARRATION

Contemporary art has for many years utilised technology in numerous forms of expression that aim in creating virtual presentations.

In the beginning of the 1970s, Robert Wilson and artists such as Philip Glass, Christopher Knwoels, David Byrne, Jesy Norman, Allen Ginsberg and Heiner Muller created a musical experience that develops from interaction to non-narrative drama. The scene of the stage, music, noise, silence and



Einstein on the beach

dance, are all elements that composed the Visual Theatre (1976). The concept of the theatre places movement and stage events independently from space and time in a way as the surrealist author Lius Arragon describes as 'an extraordinary freedom

machine'. The first performance was given in 1976, 'Einstein on the beach' a four-hour performance consisted of technology, music and philosophy, a 'science fiction opera', that included a trial, a steam locomotive and a futuristic spacecraft. The innovation of the opera, in relationship with its traditional form, was a non-linear narration, no orchestra in the pits, the libretto was replaced with numerical and syllabic counting, while a small instrumental ensemble supported by electronic keyboards was placed to the right of the stage.

In order to further develop his experiments, he created the opera 'Monster of Grace'²³ an opera that applied the latest process of 3D digital depiction and production in 70mm film.

The results of this collaboration were a radical theatrical happening in which the spectators followed and emerged into the performance by wearing special glasses.

The characteristic of this opera was its abstract development and loose structure that was made apparent in the panoramic camera movements that ended in close shots e.g of a cyclist, a falling shoe and an amputated hand that ultimately describes an accident. These

detached scenes, describe the story as a brief storyboard, aiming at inviting the spectator to connect the in-between scenes according to his fantasy.

Wilson's images, Rumi's verses and Glass's music do not have a common narrative logic. Each entity operates autonomously in the exact same fashion to the options available in a VE's performance.

The common characteristic is the non-linear flow that governs the presentations in contrast to traditional opera.

- **The phenomenon of a drama's non-linear flow, is the characteristic element that governs a virtual performance. It's position is strong enough to create aesthetics as it urges the spectator to consider his choices, thus transforming him from a passive into an active participant.**

5. VIRTUAL PERFORMANCES AND DEVICES

'The phenomenon of VR is an emerging field of applied science'. Heim (1998, pp.4)

The 'Virtual Environment' expresses all areas of contemporary society. The element that is of interest to this study is the technology of virtual reality that generates the virtual environment.

VEs require data entered by programmers. Computer-generated scenes are created with which a participant can interact by using computer-controlled input-output devices. The construction of virtual environments does not necessarily depend on reality but on the artist's fantasy and creativity. The creation of simulated worlds, controlled by computers, create the impression that the participants are not present in the real world but have been transferred into another one. With data-gloves, the spectator can manipulate his position and discover the characteristics of virtual models that appear in the environment.

Head-mounted display devices, which can be a helmet, goggles, or other apparatus that restrict participants vision into two small video monitors, one in front of each eye. Each monitor displays a slightly different view of the environment, which gives users a sense of

depth. The participant has the impression of being in a 3D virtual environment, an impression created through stereoscopic optics.

It is obvious that with the use of appropriate software, the use of gloves and head-mounted display systems, a participant can create a combination of activities in the environment in which he is active.

Take for example the experiment of an Artificial Reality system for interior simulation 'Mr. Living Room'²⁴ On a wooden floor (2.8m x 4.3m) with special furniture, two participants with see-through HMDs, experience virtual interior simulation by selecting and placing the furniture or objects.



"Mr Living Room"

Today, in order to enhance the sense of reality, some researchers are experimenting with tactile feedback devices (TFD's). TFD's transmit pressure, force, or vibration, providing users with a simulated sense of touch. For example, a user might want to move an object, which requires the sense of touch. A TFD would simulate this sensation. At present, however, these devices are crude and somewhat cumbersome to use but soon more user-friendly applications could be developed.

- **Scientific innovations are the factors behind the development of virtual performances.** More specifically, these are the devices that allow the user to immerse and interact with the virtual world.

6. VIRTUAL PERFORMANCES – ART OR TECHNOLOGY?

Does technology formulate art? Or is it art that formulates technology? No exact limits differentiate art from technology. Artists such as Dan Sardin, Myron Krueger, Aaron Markus and Patrick Clancy develop computer systems that control interactive environments, as a kind of '*land art*'. Around about the same time, Boeing scientists experimented with simple cinematic background projections.

As mentioned before, virtual reality is a concept that materialises with the assistance of technology. Virtual reality cannot be seen as a creator's tool. It is not the chisel, the colour

or the lens that will allow the creation of an art work. It is an idea. Therefore it needs a form of creative expression whose transmission is assisted through the above tools mentioned.

Therefore, it is a medium existing between the machine and the participant who provides the information. The computer-generates virtual reality worlds as it receives information on the user-participant's motions through sensors in the HMD, on the user's hand position and movements via the data-glove. In the computer-generated 'virtual world', the user's view changes as he moves his head. The user can also see his 'virtual hands' that pick up and manipulate objects within the virtual world.

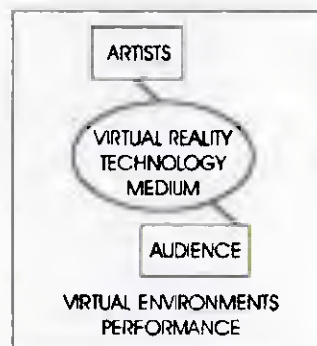
It is also the medium through which artists apply their ideas and create performances in the virtual environment. It provides the opportunity for a variety of experimentation as it is still in its embryonic stages. This fact intrigues creators to present their inner world, an artistic expression that was not often possible with traditional means.

The virtual environment offers the possibility for virtual representation, whereas virtual reality only presents the result. In other words, it is the tool for the presentation's materialisation. The presentation takes place in the virtual environment. Therefore, it is a tool used by the artist to express himself in the virtual world that operates as a theatrical stage.

Nonetheless, this powerful tool has its drawbacks such as the awkward and cumbersome accessories operated by the users whilst experiencing the presentation. Another important limitation is the temporary incapability of computers to process large amounts of graphic data in real time. However, with the constant research in this field, improvements and changes in software are daily noted. This will improve data structuring and organization, allowing users to quickly rearrange information for easier understanding.

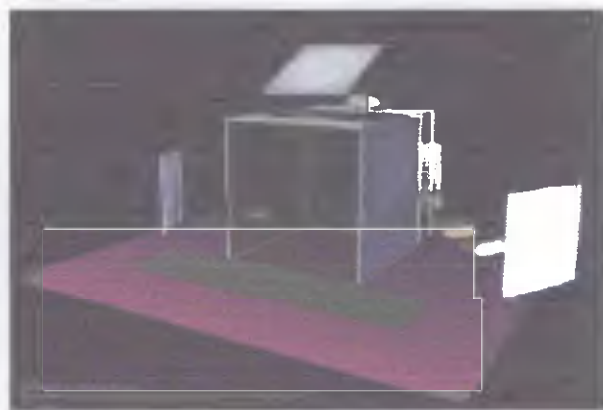
These limitations are not of prior interest in this study as they are firstly temporary and secondly artists operate through the process of inventions in order to present their expressive aspirations. The role of the possibilities offered is quite small in comparison to the range of options that the medium offers and which simultaneously influence the aesthetic development of art and society.

- We face an artistic happening of vital importance that has already begun to influence society and technology.
- It composes a medium between the computer and the user in order to transmit available data.
- Virtual Reality as a medium, could be compared to the oil paint technique whose distinct capability yields all the tangibility and substance of realism. This need in the past was covered with oil paintings²⁵ used by the upper classes to decorate their mansions and to 'travel' into virtual worlds of fantasy thus escaping from everyday life. In the 1960s, their place was taken over by huge photographic posters that decorated rooms or public areas. Today the virtual environment fulfills these same needs.



7. VIRTUAL ENVIRONMENT

7.1 CAVE



CAVE system

By referring to the puppet theatre, Plato chose to emphasize the difference between the perceived and unperceived concept of the 'CAVE'. The CAVE today is an area in which one experiences a virtual reality performance. It is a dark area through this train of thought, he captured the allegorical in which the users, wearing

dark glasses and sensor gloves, are linked to the system. Plato in his *'Republic'* describes them as "chained". The myths' shadows are the performance in which the user is invited to participate through the virtual reenactment offered as a type of training, entertainment or therapy.

What the theater, cinema and video-art have in common is that they both take place in a dark area and with the same light conditions as the VROOM images, better known as CAVE²⁶, (CAVE Automatic Virtual Environment) a 3 sq. metre room).

In the darkness, the colours are livelier and the viewer relaxes more and is immersed into the theme more easily.

Therefore the fundamental difference from traditional non-animated art forms is concluded, as traditional art works are presented in galleries or museums which have abundant light.

Art that is developed in the virtual environment ignores the boundaries of the static image due to the technological development of multi-sensory systems. The senses play the primary role as optics, sound and movement stimulates them.

Due to the needs of virtual presentations, the theatrical stage is transformed into a CAVE. It is a system for projection-room immersion. SID (spatial immersive display) is a domed projection system that has long been used for tactical jet simulators. Some centers²⁷ use panoramic projection screens. Multiple video projectors can create a single display with wide field-of-view. The CAVE and SID have more advantages than HMDs: simultaneous collaborative group viewing, high resolution and wide field-of-view, no cumbersome headgear, low viewer fatigue, user mobility, single and multi-user interactivity, stereoscopic viewing, collaborative sense of presence, etc.

The CUBE²⁸ stands for Computer-driven Upper Body Environment. It is a 360° display environment composed of four 32" x 28" rear-projected Plexiglas screens. Guests stand inside the CUBE, which is suspended from the ceiling, and physically turn around to view the screen surfaces. The screens are approximately 1' from the guest's face and extend down to his midsection.

The Virtual Room in the Helsinki University of Technology is a state-of-the-art installation, with high-powered Silicon Graphics computers providing extremely high-quality computer generated images (CGI)²⁹ in real time. These are simply pictures, unless the artists turn them into 3D images by using stereo glasses. The intrinsic difference between a picture and the actual object is that the picture has no *depth*, a fact that interests artists and urges them to further experiment in order to improve equipment used for 3D object effects. On the other hand the audience also strongly desires to experience the virtual areas of a CAVE or other similar systems.

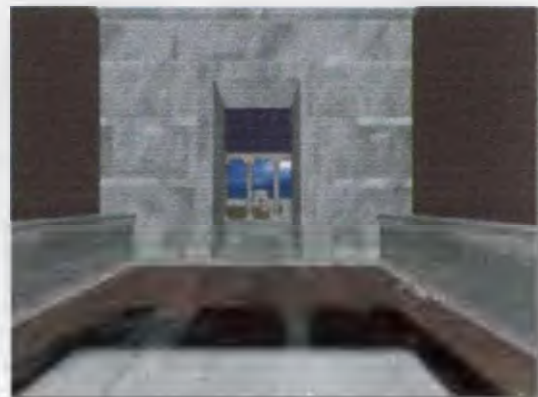
In the CAVE, we use lightweight stereo glasses from the Stereo Graphics Corporation. These glasses allow several people to share the same virtual experience, as for example the Ancient Olympia performance.³⁰ Those immersed³¹ into the CAVE do not experience disembodiment, but an instinctive knowledge of natural presence on the stage, between animated action, orchestrated sound and interactivity. Interactivity takes place in the Virtual Room and is achieved using *motion trackers*, which allow the VR system to react to the controller's movements.

- **Virtual performances are experienced in dark areas (rooms) such as a CAVE, SID, CUBE and other technological innovations. Darkness is what characterises all performances and differentiates them from traditional visual art.**

7.2 Activity

Every art form that is derived from conceptual art, such as the theatre, involves activity. This activity is experienced through the performance.

The computer-generated world of virtual reality will offer almost unlimited possibilities. These virtual worlds need not be limited to the practical laws of nature. Through virtual reality, users can visit places that are impractical or impossible to go, or places that have never even existed.



Ancient Militus

We therefore have activity in a performance viewed in the virtual environment. For example a trip back in time in order to see the sights and buildings of ancient Militus.³² A performance that depicts the entire ancient city. It is inconceivable to travel to an ancient, lost city, to walk through its streets and admire its architecture. It is even more unthinkable to get an aerial view of the city, as if we were birds flying over it or to swim in the depths of its harbour.

Every user feels and experiences his own feelings. The same thing occurs in the puppet theatre that does not allow the audience to identify with the hero. The puppet theatre belongs to the abstract theatre. Gouhier (1991, pp.132)

In the virtual environment, the puppet and its strings could be replaced with a 3D model whose 'strings' are operated not by someone backstage but by the animator. The animator therefore provides life to the model, replacing at least bodily, the actor on the stage. Voice however is still borrowed from an actor or announcer.

- Therefore, the way in which activity is viewed reflects the form of abstract theatre (conceptual art) as the protagonist is the user who participates in the performance.

7.3 Identification

Artists who build around this area use the spectator as an actor. They predict each role and handle action as in the traditional abstract theatre, cinema or video art. More specifically, they create feelings such as joy, peace or sadness according to the needs of the script in order to attract and hold the viewer's attention.

- In the virtual environment, perception does not seem to differ from an individual's natural experiences. However the feelings derived are often more intense and can be felt with all senses available.³³

Gouhier (1991), states that *'if we abolish presence and maintain the actor, this will lead to an art form different to that of the theatre -this is the cinema.'* The cinema together with the theatre, are certainly the forebearers of the art form that this thesis examines. The cinema has rightly managed to be acknowledged as the 7th art form by creating it *'own regulations and language'* Jakobson R. (1960). This language often makes the spectator's eyes and conscience to identify with the hero's actions in the performance and more so with the cinematic hero.

The live actor, despite his talents, is a realistic element in the drama that often reaches levels of fantasy. This can often consciously or sub-consciously annoy the spectator. It is a foreign element that enters and establishes the drama's development. Another phenomenon derived from experiencing the performance is that the audience often follows a performance and identifies with the actor instead of the plot's hero.

The element of the prototype-man does not exist in Virtual Reality presentations –it is merely a simulated reproduction.

- **It allows the spectator to enter so realistically and to take on his role in such a natural manner, which is similar to everyday life.³⁴**

Even if he faced a virtual supporting-hero, he will interact with him as an equal. It must be noted that the spectator has his own role in a virtual performance. He faces the world through his own eyes and not through the eyes of the hero, as in the theatre or cinema. He thus creates his own visual angle and eliminates psychological identification. No other art form, except maybe music, has succeeded in creating immersion conditions without the element of identification.

A 3D model is not activated, unless the user animates it. It is the ability to present the hero-model. With these characteristics, the virtual environment discovers its aesthetical originality. It has common elements with the puppet theatre, in which, through virtual models, identification is not such a powerful phenomenon.

In a virtual performance, the spectator-participant takes on the hero's role. He must find his own way and experience various conditions through the performance. He is responsible to provide direction through the choices offered by the scenario of the performance's development.

Therefore, his identity remains intact, as in the real world. He hears, sees, operates and guides his body according to his choice. In other words, he is 'himself' and feels through his experiences.

- **This is the most important characteristic as it offers the conditions to experience highly emotional events.**
- **The aesthetic encounter is heightened with the ability to govern the participant's visual angle. This visual angle is inside the performance, surrounding the participant.**

It is not absolutely certain whether the participant is called upon to take on a role. The chances are that he is urged to impersonate himself. In other words, to react according to the different conditions created by the performance's plot, just like everyday life. Despite the above, man cannot follow the same course of action in a virtual performance as in real

life. It is therefore noted, that the increased symbolic abilities of VE's performances, introduces a new manner of narration and coding.

The relationship between man and the theatre, cinema and VE's performances is radically different. In theatre, the stage determines a theatrical behavior. The actor uses more gestures, talks louder and more often than what he would do in everyday life. All these elements compose mimicry.

In cinema, acting is simpler because the actor's behaviour on the screen is more lifelike and provides spectators with the impression that they are directly viewing reality. The element of reality is created from the structural contradiction in the actor's cinematic performance. On one hand, it aims at movement via natural motions of daily life and on the other, it carries theatrical cliches, such as expressions and gestures.

Reference is made to the silent cinema in which actors expressed themselves with gestures and grimaces that stemmed from heterogeneous semantic systems such as the marionettes or the comedy *Del' Art*.

- **In virtual performances, the participant does not have to speak or gesture in a certain way. His kinetic behaviour follows his natural movements. In other words, it is directed by the role he plays in the performance's development. Initially, this is hard for him to carry out, but he quickly adapts to more natural reactions.³⁵**

He has the ability to choose his role from a selection of choices and to escape from the psychological pressure of his everyday problems.

Another conventional role perception stems from the cinema and is related to the nature of the performance. This nature is regarded according to its artistic composition, its conventions, symbols and the participant's interaction with the virtual work.

- **The participant can formulate the plot's development and provide the rhythm through his response to the proffered symbols.**

The participant's involvement with the performance is similar to the construction of a film. For example, sequel filming does not follow the scenario's narrative sequence neither does the actor perform scenes in the same order that the director will finally place them. In a similar manner, the participant in a VE's performance will 'edit' his action according to his desire at the specific moment of experiencing the performance.

- **The characteristic of the audience's dual role, as actor-spectator, provides the property of 'individualism' to this art form, which is none other than the art form of virtual performance.**

"A new theatre will never emerge unless the contemporary man will be able to simultaneously whisper the words with the person on the stage, and to the same effect" Jean Copo envisions (cited in Brook, 1999). Today, this vision has materialized thanks to current technology. The participant is not only able to whisper the words belonging to the 'person on the stage' but also able to select the moment to do so. He therefore surpasses Copo's vision and creates a new reality, his own.

- **The virtual presentation abolishes the actor. The spectator takes on the actor's role and the responsibility for the performance's development. This is an important characteristic that produces aesthetic results of high quality and supports the autonomy of this art form.**

7.4 Virtual Art

The successful combination of all art forms is achieved together with the input of technology.

It results in a virtual performance, which *'combines and integrates all art forms'* Wollen (1969). It succeeded in influencing the new art movement named Fluxus. This movement begun in the 1960s. The aim of its artists-followers was to overcome the barriers between arts and to combine music, dance, plastic and applied arts.

7.4.1 How Fluxus influenced VE's art

Dick Higgins describes fluxus as a branch of American post modernism that reflects in

American society. This influence has repercussions on all art forms such as P. Corner's Piano Activities and his own Danger music (1962).

Influenced by Marcel Duchamp³⁶, he proposed that the artists must explore the region that lies between the '*general area of art media and life media*'. It prompts unorthodox art combinations, such as '*The soft Drainpipe-Blue (Cool Version)*', Claes Oldenburg³⁷ (1967) that mixes sculpture and painting. With the involvement of inter-media, any available object or experience can play a role in the artwork.

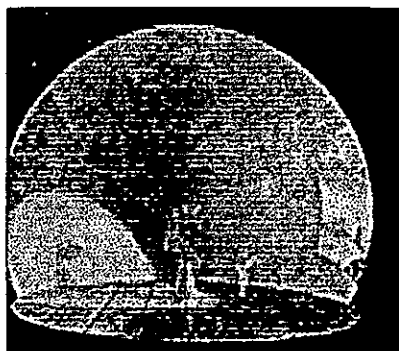
This combination goes a step further by trying to correlate the artists to the audience. Thus the expanded cinema is born. Artists that express themselves through this movement aim at stimulating the spectator in being an active and not merely a passive participant. This is successfully achieved with the interaction between the participant and the virtual environments.

The progression from the birth of the expanded cinema to the appearance of art projected in the virtual environment can be seen in the works of Jeffrey Shaw³⁸, '*Corpocinema*' (1967) and '*Eve*' (1993). In a manner of speech, they are the parents of the art form that develops in the virtual environment.



Corpocinema 1967

Corpocinema's concept is not based on the story presented by the projected images. What interests the artist is the experimentation with the image's temporary structure, the environment and finally the manner in which it is projected (references were made by various Video Art exhibitions). In the transparent dome, images were projected onto a transparent skin, whose outer cover operated as an opaque material, with the use of various colour substances. The



EVE 1993

dome's opaqueness could be controlled with semi-transparent balloons or hoses. With this experiment, the artist noted that a new type of spectacle emerged, whose structure could be influenced by the audience.

The presentation has a flow and flexibility similar to the artistic approaches applied in virtual environments.

In the subsequent performance of EVE, it is noted that it provides a surrounding and immersive space wherein the interactive movement of the image window which reveals a virtual environment. In this way, EVE constitutes a uniquely new strategy for the visualization of virtual scenographies. The ZKM intends to offer this apparatus to visiting artists as a context for the realization of interactive virtual reality-type projects.

- If the researcher attempts to compare these two works he will find similarities in the artistic approach not only in its external appearance, which is in a dome-like form, but also in the intensity between the real environment and the Corpocinema presented in the film's virtual environment. Similarities are also noted in the intensity between the action space of the participants and the virtual environment in which the videos are projected on the EVE dome's external surface.
- Another finding was that the traditional cinematic camera was replaced by the video camera.
- Experimentation with the video-camera brings life to a new art form which is even closer to the subject-matter of this research. Video-art appears in order to promote conceptual art, namely the presentation/activity's performance. In this presentation, the artist exhibits his work only once, in a specific time and place and under unique conditions. This particular element of art is developed in the virtual environment and is used to present the work by the viewers' interaction and consequent experiences which are derived with a single exposure under specific conditions. The artist creates the environment and the conditions, and the viewer is invited to willingly participate when he chooses to and to formulate the plots' development.

7.4.2 The autonomy of art in the Virtual Environment and its Role

The product of art is wrongly considered to be a tangible entity as for example an object (sculpture, painting, etc). A work of art can be an idea or feeling derived from the artist's inner world.

Initially, digital art was based on batch-processing computers. With technological developments, creators can now utilize the ability of interactivity, an element that characterizes a virtual performance.

Therefore, with the characteristic of interactivity, virtual worlds could be a major new medium of information transmission, based on the collaboration of science, technology and art. The field of VE's is concerned with using the computer as a tool to help understand the space around participants, in other words to see the



Bill Viola's installation

unseen. The participant views his environment, which in reality does not exist. The science is still in an embryonic stage and has a long way to go in order to be capable of solving many problems faced by artists. This element however, stimulates and encourages scientists to carry on their research in this field. It is therefore the demand of creators to materialize their ideas. This is one of the main reasons why art plays such an important role in the synthesis of virtual worlds. The result is the creator's inner world merging with the participant's world. This interesting concoction is art. It is an advanced art form that has not been experienced so far by mankind. This is also supported by Bill Viola³⁹ '*the computer, has lead us to the next evolutionary step*'. All traditional models of artistic expression are reborn through the abstract processing of information technology. Therefore, artists have the chance to reconsider the issue of communicating with their audience.

The virtual environment is '*A medium for expressing art*'. Kadinsky (1980, pp.27) where in order to project the creation, all existing art forms are applied, such as architecture, sculpture, painting, theatre, dance and music. Moreover, performing arts incorporate all forms, which develop as a combined entity.

The Virtual Environment has its own regulations and language. These are the elements which classify it as an autonomous art form, according to Kadinsky (1980).

Artwork produced in the virtual environment is works of aesthetical value that fulfils the three defining values⁴⁰, Schaeffer (1996):

1. The nature of the environment (huge/small, circular/square, e.t.c.).
2. The nature of the tools used (computer, collage, pencils, e.t.c.).
3. The nature of the models synthesis and movement (intention/direction) in the environment

They include many types of artistic expression and art forms. This does not mean however, that many traditional practices are not acknowledged in today's performances, such as the organization of form and space.

- **The loose structure and element of interaction together with the elimination of the actor's presence, creates new semantic codes that demand a thoughtful and active spectator who will facilitate communication.**

7.4.3 Cinema, theatre, video, painting, dance or sculpture?

Finally, what is the art form that will emerge so strongly in our life and claim our future? Is it simply another and greater interaction with technology?

The result is the final formation of this new art form, in which the experimentation with new technological means, provides us with elements that have yet to be fully examined in order to provide us with a concrete picture of this emerging art form which is constantly evolving.

Paik (1992), suggest that art should embrace information technologies. He presents himself as an artist-magician synthesizing art and technology in an effort to exorcise the demons of a mass-consumer and technology obsessed society.

At this point, one can question whether a VE's performance is art or technology. The answer is simple –it is art that is fundamentally based on technological developments. Marc Canter⁴¹ envisioned the digital artist of the future as an art form media '*composer*', synthesizing frameworks of graphic animation, text, sounds, etc into a single artwork -a creation of



Marc Canter

presentations that originate from traditional forms. He develops his vision with the opinion that the desktop multimedia should evolve into an intergrated artistic entity.

It is clearly art, '*Art is mainly a form or work*', according Ernst Fisher (1981) and '*a language source*' according to Ztandoff and Loukats, (1994).

Allan Kaprow, (2000) enhanced their belief and describes art as a continual work in progress, with an unfolding narrative that is realized through the audience's active participation.

'Traces', by Simon Perry (1998) for example, is an interactive art performance. There is an emphasis on the high-tech mediated nature of communication. A processing of objects, sounds, movements in *Traces*, (virtually sounds, movements and visual experiences are generated in real time based on the participant's behaviour) produce



Traces

a result from which the spectator derives conscious or unconscious knowledge -knowledge of communication with the other participants without them seeing each other.

Art can often provide man with a conscience and allows him to create within the social group that he belongs to. We must not forget that **Socialistic Realism** considers art to be responsible for awakening man's sense of responsibility.

In the performance, 'KALI, The Goddess of the Millennium' (2000), the creators wished to trigger mankind's interest in nature. The performance was staged on a jungle hill. In principle, Kali should harmoniously and dynamically integrate themes, such as history, mythology, nature, cities, chaos, equilibrium, evolution and art, establishing a sort of active pathway between the orient and the west, the era of the myth and that of electronics, the cosmos and the planet, nature and the city.

'Among the main objectives of the performance, is the outstanding desire to project questions and answers such as... how will the human specie evolve in the next millennium and what turn could the human, vegetal and cosmic existence possibly take.' (F.A.B.R.I.CATORS 2000).

Engels claims that *'a new form or materialism must be expected with each major scientific invention'*. (Cited in Fischer, 1981).

This can be approached in another way, stating that every major scientific or technological invention creates new forms of art expressions. It presents new possibilities for creators to seize, experiment and develop prototypes. The computer's capabilities opens up new

communication channels. *'It frees us and allows us to experiment with new art forms.'* Vince (1992, pp.152).

- **An element that characterizes art, is the audience's awakening, a factor also presented in virtual performances.**

This very new form of expression that appears in the virtual environment is not well established in order to ensure its theoretical conception. Artists portray cyberspace travels in new ways. Fractal art, virtual sculpture, sounds and animation will provide aesthetic quality to cyberspace.

Virtual reality reveals new worlds that were otherwise hidden or inaccessible. The audience does not view items or circumstances in a different way from traditional art forms. They are exactly the same but experienced in a completely different manner. The distance, between the work of art and the viewer, disappears owing to the elimination of the external distance that so far composed a fundamental obstacle in experiencing a work of art.

The viewer is in the area and interacts with a pace that reminds one of the pace of everyday life. The fast and constant flow that is experienced in the cinema and TV do not appear though this research to have meaningful existence. Action follows a more natural pace, similar to that faced in everyday life.⁴² Furthermore, points of identification did not appear, at least from the research results conducted by interviewing participants.

In the virtual environment, technology allows the spectator to be transferred into the area that produces the virtual environment. In *"Landscape one"*⁴³ Luc Courchesne (1997), the space, set in Montreal's Mont-Royal Parc, is visited by real and virtual characters. The virtual characters appear to freely enter and walk out of the garden. By experiencing the performance, the virtual spectator thinks that it is just as easy as everyday life. In other words, to visit the park whenever he wishes to.

The spectator sees and experiences various sensations whilst being immersed in the artwork. Objects that form the virtual environment thus surround him. Such as the, *Mitologies* (1998)⁴⁴, is a virtual performance created for the CAVE. The concept behind

Mitologies was to blend elements from the given narrative sources, such as the Cretan myth of the Minotaur, the Revelation, etc., and explore their interconnections. The areas are composed of elements that have symbolic meanings for the participant. These objects send out messages that lead him to develop the performance's plot whenever he chooses to.

The participants that enter the CAVE are initially located on the bank of a calm river. From a distance, one can hear the creaking sounds of a wooden boat and the subtle sound of water washing against the river banks. The boat slowly appears. As it approaches the shore, the participants are swiftly transported onto it and their journey down the river begins. In the physical space of the CAVE, two benches are placed in a way that corresponds to the virtual benches of the boat. Thus the illusion of travelling in the boat is very strong,⁴⁵ as the participants can look down at the floor of the CAVE and see the virtual boat rocking beneath their feet.

'Technology is intermingled with intimate human life as a part of the molecular structure'.
(Alla Mitrofanova, 1994) ⁴⁶

The medium for the creation of artistic happenings is information technology. It is the linking element for the expression of artistic communication.

In contrast to previous media, computers are the only tools available today that allows the users to meet up in a public area, reminiscent of the ancient Greek *Agora*, in the Golden Era of Pericles, 5th century B.C.

- **Computer technology, beyond its ability to construct illusions, can also provide numerous ways of interactive communication. This involves reciprocal communication between the user and the performance. With this type of communication, the user develops the plot and directs the performance according to his wishes. It is obvious that information technology is a medium of creation, expression and exchange of ideas. It is an autonomous art form that can raise social and political issues. It awakens and urges the audience to think.**

7.4.4 The Cross Cultural Phenomenon and its Role in Art

The cross cultural phenomenon is one of the most important issues in the field of digital art. Artists are interested in discovering means of communication via the internet that for the last 15 years has drawn together users from all over the world. ('virtual gatherings' of participants and the electronic transmission of images and sounds enables interactive communication and collaborative work among the users). The chasm of different cultural and social contrasts is narrowed and common grounds are founded between opposing cultures. *Mitologies*, a virtual reality performance, is an example of the cross cultural phenomenon. It is loosely based on the Cretan myth of the Minotaur, the revelation of St. John, Dante's "Inferno", Durer's woodcuts after the revelation, and Borges' Library of Babel. The connections between these sources are central to the narration's development.

The combination of these cultural elements, noted in the society of cyberspace, is one of the most crucial factors that creates aesthetics. Research and experimentation on this cultural gathering, is the most challenging element for the artists involved in digital arts.

- **The cultural phenomenon that develops in cyberspace, due to the medium's nature, directly affects creators of virtual performances. Cultural isolation is eliminated and art takes on a global quality.**

Artists who experiment with VEs, are often artists with a classical education or software programmers who attempt to formulate their creations in the virtual environment.

Artists have the opportunity to create via a 3D environment. With this capability, they approach their creation in a more integrated manner. They operate as sculpture designers, architects even as film directors or operators.

Another example of this trend is Bill Kluver⁴⁷, who was considered to be the leader of the artistic and technological movement presented in the Modern Art Museum (1960). He participated in this event with paint bombs, chemical stinks, noisemakers and fragments of useless pieces of metal. Artists such as Jean Tinguely also took part in the exhibition with his famous self-destructing kinetic sculpture '*Homage to New York*'.

For example, Collen, an architect who has interacted with computers since 1988, has viewed his involvement with the virtual environment as a natural consequence of his work. Through this train of thought, he created the virtual San Francisco, an interactive travel guide. The creator explained that *'the aim was not to simply create a model of San Francisco, but to develop a new interface that would guide the user through cyberspace.'* Collen, (2000).

On the other hand, Lucas Film Games developed the *"World of Habitat"*, a virtual game that was launched by Quantum Link Communications. Through this environment, the users have the chance to meet other players (avatars) and to play their own virtual type of life. This was not as successful as the new version offered by Fujitsu, Japan. Florida Theme Parks, in Disney or Universal studios create for spectators the illusion of reality that is experienced via the virtual environment.

- **With research and experimentation, results were formed that presented an evolving aesthetical identity. In the virtual world, artists who face such a performance, need to have a wide spectrum of knowledge. The wide range of required knowledge, brings them back to the model of the renaissance man, which has been formulated according to their technological demands.**

Peter Weibel⁴⁸ (1999), has also formulated a theoretical opinion with regards to art expressed via the net. He states that it's functions and properties operate as factors for the aesthetic and social transformation of culture. He claims that the global net is the driving force of the next millenium. Net art forms will compose a public step into new forms of expression. They will reflect the hopes of freedom from historic avant-garde.

8. CONCLUSIONS

Virtual reality is a medium like oil painting, photography, etc. used by the artist to create an artwork. The artistic product is the VEs performance. It is an autonomous art form that has its own expressive language (non-linear narration) and provides the user with unique immersive abilities and experiences.

It is a form of art that simultaneously develops with information technology, as IT provides the flexibility to develop sophisticated design systems for artists. Moreover, from the historical results of this research, the intrinsic relationship between art and technology is apparent.

Artists face the challenge of interface design and are called upon to use animation, 3D and other stage effects in order to achieve, on behalf of the spectator, successful immersion conditions.

In the next section, the aesthetical situation, due to digital technology, will be also described. Following the definition of aesthetics, the results of the investigation regarding the developments and influences of aesthetics in this century will be presented.

Virtual performances are limited events that cannot occur without the performance itself. This characteristic is sufficient to provide cultural events with an aesthetical identity and influence.

The next section attempts to determine the aesthetical identity of virtual performance art. In other words, how the characteristics of the art, as described in this section, produce aesthetics. More specifically these characteristics are:

- **Interactivity**
- **Interrupted flow of information**
- **Ways in which creators use the audience as a tool**

C O N T E N T S

SECTION THREE

1. Introduction 65

2. Aesthetics 66

 2.1 The Science of Beauty 66

 2.2 Exogenous Influence 68

 2.2.1 Geographical and Historical Influence 68

 2.2.1.1 Cyberspace 69

 2.2.2 Political Influence 73

 2.2.3 Social Influence 74

 2.2.3.1 Cross Cultural Phenomenon 79

 2.2.4 Economical Influence 80

 2.2.5 Technological Influence 81

 2.3 Endogenous Influence 83

 2.3.1 Aesthetical Values and Symbols 83

 2.3.2 Morphological 84

 2.3.3 Content 86

 2.3.4 The social role of virtual performance 89

3. Interrupted Flow of Information 89

 3.1 Interaction 89

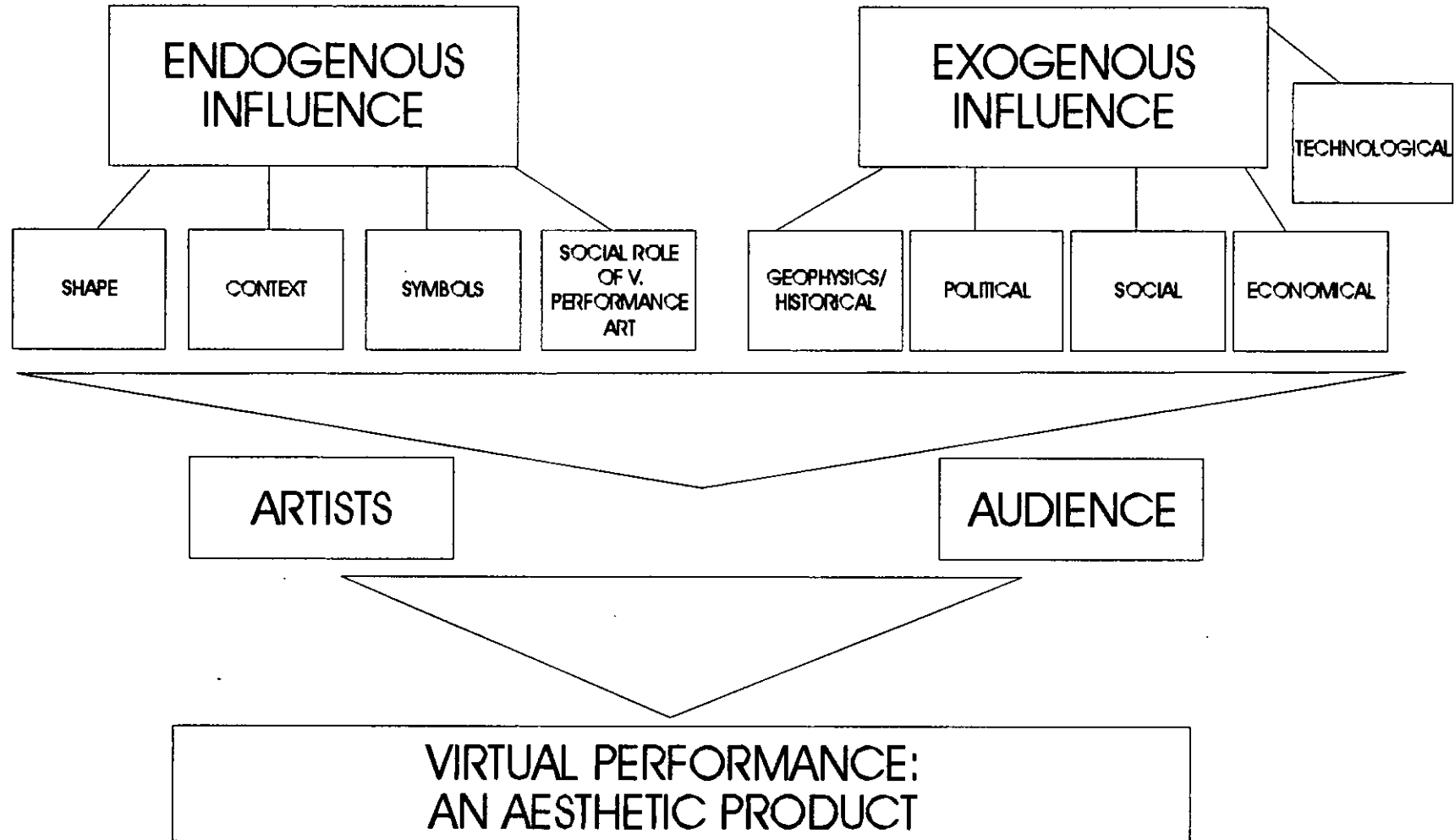
 3.2 Audience 90

 3.3 The body as an aesthetical object 91

4. AuthenticArt 93

5. Conclusions 95

SECTION THREE



SECTION THREE

Virtual Performance: an Aesthetic product

1. INTRODUCTION

Art is presented as a balance achieved with the contribution of most sciences. The correlation of art and science, offers an aesthetical enjoyment that can be experienced by contemporary audiences. This is a finding and aesthetic act, which emphasises that creative and conceptual acts are inseparable.

As noted in the previous section, virtual performances are like other art forms -a product of personal experience. The difference is that in virtual performances, interaction allows the audience to participate and therefore consciences are stimulated and participants learn to think and guide their bodies, thus fulfilling their predesignated roles.

A virtual performance includes elements that are necessary for the involvement of both mind and body. If these elements do not exist, the audience becomes simple spectators of an artifact exhibition.

Therefore, cultural elements derived from studying virtual performances also witness the harvesting of knowledge that results from the experience of such a performance. This experience, is completely different for each interactor. These results emerge from interviews and statements from people that have experienced virtual performances, also including the author.

The spectrum of this research begins with the transcendent art of this area and the aesthetics of investigating art in conjunction with unsurpassed technological developments. As it can be seen, this factor tends to rejuvenate the audience's intellectuality through a technological dimension. In order for results to emerge, the following question must be raised. What is aesthetics and what are the influencing factors?

What is most interesting in the cultural happenings of cyberspace, is not the issue of telematic fantasy but telematic danger. Telematic danger can cause a number of ethical problems with regards to the image of the real world. According to the nature of the virtual performance, the invincible power that the interactor seems to take on, by controlling the electronic environment with buttons, can result in feelings of fear or pleasure.

The role of the traditional artist is transformed into the role of an electronic artist. The results of this transition, is an art that stimulates the aesthetic and cultural elements of the digital environment. A union is created between scientific developments and creators ideas. The consequences of this union often arouse social and aesthetical issues. Religion and ethical values are some of those issues that have occupied society for centuries.

Despite all these social happenings which affect the aesthetics of art in each society, we also need to examine the origins, developments and rules that govern its form. It is necessary to further investigate beyond its sociological effects which are obvious in the artist's work, as stated by Andre Marlo: *"Works of art, despite their morphoplastic strength and role in large civilizations, also express through their creation, the eternal question raised by the world."*(cited in Mourellos, 1985, pp.23).

In many art works, one can observe philosophical questionings that concern the human soul and that can create aesthetics of various forms. Thus a new type of aesthetic is created -the aesthetics of the digital environment based on technology and the communication of information.

2 AESTHETICS

2.1 The Science of Beauty

According to Kyriakopoulos, (1969, pp.18) aesthetic agreement is the science of beauty. *"Beauty is the produce of harmony created by pleasure."* As depicted by Professor George Mourellos, (1995).

According to Plato (1999), aesthetics have no relationship to natural beauty, but are related to the experience of love or more appropriately 'Eros'. With this statement, Plato refers to the metaphysical relationship created between the intercourse and exchange of energy, that Kant also refers to as a *'most powerful experience'*. Adorno stresses that *'An authentic aesthetic experience must become a philosophy, otherwise it is totally inexistent'*, (1986).

Aesthetics, as a science, cannot stand alone. It follows philosophical reflection. An aesthetic experience is the knowledge of the world that pulses and transmits this knowledge. The artist-transmitter begins with a philosophical reflection of the universe and attempts to transfer this theory and present it through his work. At the time of creation, he is indifferent

to the aesthetic result that will emerge. Nonetheless, the aesthetic value of a work of art, through which universal balance and truth is reflected, is of vital importance to the spectator-interactor's pleasure.

- **Through available technology it can explore aesthetics through the stimulation of the senses of touch, sound and acoustics that can be created by experiencing a work of art through the virtual environment.**

"Aristotle clarifies that the aesthetic truth (what is felt, remains intangible & inactive if it cannot be affected by the tangible (whatever is created by sense). The energy derived by the tangible effect and poetic factor is sense (Karastathi, 1997).

"Therefore, works of art lack aesthetic quality when clearly stressing the element of rational thought to such an extent, that the type of rationale applied, only slightly differs from instrumental rationale." Adorno, (1986, pp.86).

"A TV series or industrial products are not works of art." Georgiou, (1989, pp.67). The author disagrees with T. Georgiou's opinion. How can we exclude the fact that a work of empirical reality or cultural practice cannot have aesthetic value and therefore cannot be considered as a work of art?

An artist can operate through fantasy having the capacity to combine senses and consequently direct his energy into creating aesthetics.

With various technological innovations, the current role of the artist has been somewhat confused. Art is not simply a reconstruction of the world in the virtual environment. It is according to Edmond Couchot (1992), an exercise of fantasy with an original design application *"aiming to convert the accuracy of art into the inaccuracy of aesthetics and its subsequent enjoyment."*

- **The creator must avoid the imitation of models and conditions but must aim at their transformation and development, by creating something original that will stimulate the senses.**

"An object is established as a work of art, only if the material and spiritual elements exist in the status quo of its aesthetic image. This however is the result of two opposing procedures that compose an aesthetic synthesis and establish the actual object. It concerns a) the procedure through which the aesthetic element of the work of art is transformed into essence and b) the procedure by which the spiritual element, the "essence" is revealed in actual forms and shapes." Giannaras, (1980, pp.80).

The models' already existing knowledge will never form art. For the artists, models are powerful tools that can be used to create their own pattern of symbols. Rules must be broken and replaced by new regulations that evolve through research. A product of cultural industry or empirical reality or even technology can contain features of the dialectic unity of actual and spiritual elements.

According to historical development, there are two basic characteristics of cultural practice and urban society:

- a) The establishment of the division between the materialistic and social reality and the spiritual realm of beauty
- b) The consolidation of the fact that the world of beauty is a fake and false illusion. Giannaras, (1980, pp. 80).

2.3 Exogenous Influence

The exogenous elements that influence art are those that refer to the relationship between the masses and society. Exogenous elements are often transformed into endogenous factors when they operate in depth. The above division is beneficial but sometimes precarious, as seen with the fluid roles. Therefore, it might be useful to also note how exogenous elements operate. The influence of exogenous elements 'is horizontal' (Mourellos, 1985, pp. 42). The main exogenous elements, such society, history, politics and technology are presented in detail in order to comprehend the aesthetical phenomenon and how it is influenced.

2.3.1 Geophysic and Historical Influence

There is no doubt that man, as a social and spiritual being, creates his own history. Man has created his own culture that develops and evolves over the ages, in the same way that man himself develops and evolves. His history is his own creation and is intricately joined



Gauguin, Paris

to his material and spiritual properties. Mourellos, (1985, pp.45) Society is a product of man's history and man's history is the product of society's creation.

History does not stand independently from man's position in nature, in other words the geographical and climatological conditions of the area in which he lives and operates. One of his activities is art.

The artist is directly inspired from the surrounding nature, e.g. the impressionist Cezane⁴⁹ attempted to depict his feelings towards nature, Read, (1978, pp.21). Together with other impressionists they escaped to nature in order to depict on their canvas the vibes that they received from their natural surroundings. In contrast, the new art form



Gauguin, Tahiti

that appears in cyberspace requires creators to work in closed environments, in which exist the machines that will materialize their ideas. It is hard to imagine that the works of Gauguin⁵⁰ who lived in Tahiti, were created in a studio in Paris, as they are directly influenced from the nature and society of that island from 1891 to 1900.

This highlights the danger that mankind faces -being trapped within four walls and being isolated from nature and replacing it with a simulated environment. *"The human race in the last decade of the twentieth century, is preparing to lift off from nature into another - electronic-space"*. Heim, (1993, pp.x)

Today, man's isolation from nature is a given fact. The environment in which the artist operates and creates is cyberspace.

2.3.1.1 Cyberspace

The term cyberspace is currently used to describe the whole range of information resources available from computer networks.

'It is the socio-technical environment of the proliferation and distribution of works that has engendered the mutation' P. Levy, (1996, pp. 366). In other words, it is a concept that allows the human race to contemplate in a different way, the issues that have occupied man over the years. New analogies that have been maintained in cyberspace art allow for new methods of communication between the creator and the audience. The audience's participative relationship with the performance's development is one of the most important elements that formulate



Gibson

aesthetics. Even cyberspace, is a data environment that emerges through metaphorical forms, symbolic systems created by machines. Gibson describes cyberspace as a *'Nonspace of the mind'*. With this characterization, Gibson wishes to describe space as a imaginary area that in reality does not exist. The virtual object or space, exists only in programming languages or in the environment actually displayed. Only then does the representation appear in the form of symbols and metaphors. Metaphors result from the interactor's transmission and the manner in which he handles the *'organizing metaphor'* Morse, (1998, pp.179) to select and control paths in symbolical virtual performances. Through this interaction, the audience hangs between reality and fantasy, as one world overlaps the other. The audience is often in danger of becoming confused that not being able to differentiate reality from fantasy as the entire virtual performance is based on effects and not actual existence. In this way, an aesthetical entity thus begins to emerge.

- It appears that for art to be created, the environment (cyberspace) is also considered together with the historical moment (the information technological revolution).
- The cyberspace environment is an important influencing factor on the emergence of the new digital art form.

As it has been previously noted, the artist is inspired to create from his surroundings. This is a vital element as man is a social and spiritual being. The extract from Paul Claudel's book *'The Dutch Painting'* adds that:

"... it is a matter, that after a meditative pause, is left to the imagination and is spiritualized

from a distance." (Reed, 1992, pp.17).

With this phrase, the visual stimulation on the artist is apparent. The artist refers to this energy and transforms it into spiritual activity. All the creators' feelings and sensitivities are impressed on the means that he used to express himself.

In past decades, the aesthetics of black have begun to develop. With this term, the results that occur by the lack of light must also be described, as the performance is experienced in a dark area.

The average man that experiences this globalisation remains for most of the day in front of a computer. He works, trains and is entertained in a closed environment that lacks natural light. Most works of art created in the virtual environment use mechanical constructions as a subject matter –only few use nature as a theme. Even when the artists depict nature, it is presented in a surreal fashion that has nothing in common with nature experienced by man to date.



Root of Knowledge City

Robots + Avatars dealing with Virtual Illusions

PERSONAL EXPERIENCE

With reference to the above, the environment is presented in the Root of Knowledge city. In

this city, winds of thoughts and ideas blow through the landscape that resembles the head of a man. A formation of arched bridges traverse its sky, allowing the mind to stay closed or cross these bridges into the open-minded world of Ying Yang. The majority of these works are presented in a black background with its elements dimly lit.

"... it is easy to get lost in a void that is uniformly coloured (usually black) and that wears infinity at its edges if not at a vanishing point." As described by Margaret Mose, (1998) through her many experiences in the virtual environment.

It can also be referred to in Scott Ficher's work (1989) *'View-Virtual Environment Workstation'*. The unlit surrounding area and the gray tones of the objects composing its creation, immediately give the impression that darkness is the dominant element. The same

applies to Claude Cadoz's 'Esquisses' (1993) where again the setting is black and the clock's components are dimly lit.

In Ghostcatching (1999)⁵¹, the captured movements are the main features that create the virtual synthesis. The setting is again black with luminous elements and rough lines. The works' composition is set in black.



Ghostcatching

Most computer –produced art works use black or at least other dark colors as a background.

- This creates the direct effect of drawing attention to the dimly lit components. It also develops a greater sense of immersion to the recipient in comparisoo to a strongly lit work⁵².

It also creates in the viewer the feeling that the future holds little else but death. It is the symbol of death and rejection of life as it is associated with primitive darkness. In psychoanalysis, black represents the unconsciousness and anxiety, as it does not reflect light. It must be noted that the favorite subject of artists involved in the digital world, are extraterrestrial creatures, monstrous beings, the world's destruction by viruses and the future digital society. All the above include death as the ultimate outcome. At the end of the 1990's, due to this influence, black and dark grey were the dominant colors in clothes, interior design and music.



Plant Growing

- This phenomenon can be considered to be the result of artists working in closed environments.

With the same logical sequence, virtual performances inspired from the digital world, depict nature in a particular manner. For example the virtual performance 'The Interactive Plant Growing' (1992)⁵³, is composed of a room in which plants have been preserved. These plants when touched, send pulses to a computer via a sensory mechanism. The audience can see different types of growing plants that gradually fill up

the screen. The dark room and plants are clearly a different approach to landscape, an approach that stems from the areas in which western man lives. In other words, even the environment is depicted in a digital manner. With the use of the digital environment, the characteristics of the area in which the artist works become even more obvious. The same occurs with artists dealing with VEs.



Davinci's Sketch

Mitologies

INTERNET NOTES

The church encountered represents the seven churches described in the Apocalypse:



The Seven Churches

Ephesus, Smyrna, Pergamum, Thyatira, Sardis, Philadelphia, and Laodicea. In this performance all seven of these churches are represented as one grand church, modelled after a Leonardo da Vinci sketch of a church that was never built. The subjective element is apparent, appearing in accordance to the synthesis' aim.

2.3.1.2 The Historical Influence of the Virtual Performance

There is no doubt that the artist is closely connected to the world's and his area's history and culture. For example, in the virtual performance *Mitologies*, the creator M. Roussos (personal communication, 10 January 2001) uses elements from Greek mythology (the history of her country) and combines them to international historical facts (Dante's *inferno*).

The artist is mainly influenced by the way in which he interprets historical and cultural events. The creator's subjective and personal element, emerging from his soul, is that which creates aesthetical results.

- The result presented is that art is closely related to the social entity to which the artist belongs to. He receives influences from the social and geographical climate and the events that occur in his surroundings and often creates his own influence on these factor through his art works.
- The artist acts and creates in the digital environment, from which he frequently draws upon for creative inspiration.

2.3.2 Political Influence

A relevant influencing factor is politics. Politics is part of the history that affects artistic creation and formulates aesthetics. It is hard for the creators to remain unaffected by the political climate that is dominant at the time of artistic creation. Let us refer to Picasso's *Guernica* that depicts the Spanish Civil War in the 1930s.

The ancient Greek tragedies were inspired by the dominant political trends. Aristophanes in his comedies evolved the drama's plot around the happenings of Athens. Later, in the medieval age until the late 19th century the ruling classes in either religious or political societies, took the artists under their protection in order to promote through their creations their own achievements. In the 17th century, Ludwig 14th protection of the classical French theatre played an important role.

Today, sponsors, cultural ministries and other networks, have replaced the kings and lords. They fund the artists in order for them to create art that conforms to their interests by needing indirect advertising or to promote political ideas. This is hardly harmless, as according to which target group the product-message is aimed, social, economical and political messages are also passed through the creator's works. This dependence on their sponsors directly affects artist's art and aesthetics.

- **However great the dependence, they still remain exogenous in comparison with the work's substance and autonomy.**

2.3.3 Social Influence

It is generally accepted that the artist created all for art as part of a social entity. A work of art is a means of communication with the other members of the society he shares. Art is therefore the language through which the artist communicates with society. "*Man is a social being and art is a product of his sociality.*" Mourellos, (1985, pp.80).

We note that various phenomena such as the political influences on art have a unique relationship. The phenomenon exists in which exogenous relationships are developed into endogenous as they stem from the same work, compose its motive and definition. The issue of the work's artistic value also emerges. A work that is politically influenced and its artistic value is low will not survive time.

- **In this case exogenous factors appear that affect the creator.**

If during its creation, the artist's personal statement appears, in other words, his inner world or opinions,

- **A shift appears from exogenous elements to endogenous.**

The aesthetic result is such that allows the artist to express his opinions in the most appropriate manner.

Art is a cultural phenomenon that is affected by a variety of factors. Every form of art is derived by society and refers to its totality. This relationship of interdependence and interaction is deeply complicated due to the different role elements of each member of society.

Furthermore, important and numerous factors are those that formulate the history and consequently the aesthetics of each social entity. The artist is affected by the ideologies of his time as the society that surrounds him and his audience is the source of his inspiration e.g. their beliefs, ideas and dilemmas for the past, present and future events.

- **In total, it is society's perception that affects art.**

Therefore, art does not stand autonomously but directly reflects the ideology of the society it stems from. Realism is the movement that reflects this more accurately –its pictures social events that the artist experiences. Surrealism is another movement that artists follow during the creation of virtual performances, often met as 'an interactive experience that resembles a surrealistic vision'⁵⁴.

I start the navigation through Kali Yantra. I slip through layers of transparent blue, delicate shiny clouds of petals, moving towards the astonishing center of Kali Yantra. Shiny rings under the form of a Yony emerge in front of my eyes. The eight petals stand for eight elements; each angle of the petal is interactive, earth, water, fire, air, ether, mind, intellect and egosens. Instead the fifteen corners of the five concentric triangles represents organs of knowledge, organs of action, organs of perception, organs of procreation and the organs of evacuation.



The transition into Kali's inner world can be compared with a trip into the subconscious. It clearly has a surrealist approach as the passage through layers of transparent blue give the impression of complete freedom which is the main characteristic of the surrealist theory.

However today the baroque movement has re-emerged in another form than that from the 17th century. This is a happening that we are experiencing in all art forms.

The traditional means of time keeping through meridian latitudes has been replaced with cyber systems that assist Internet communication.

On the other hand, science does provide the answer to a majority of social issues but is also creates a number of others that urge man to opt-out without getting involved.

Gone is the 8-hour work schedule by the 24-hour Internet contact thus extending work to long daily hours.

As William Gibson's (1998, pp.30) statement was clarified by Patrick Lore, a specialist in the area of progressive medicine "*no one will have the right to feel tired, whatever their social class and occupation*". Dalloni, (1999, pp.4)

Through all these developments, the ongoing philosophical questions remain. An important question concerns the future of the human race. The industrial development operated



Star Wars

independently to ecology thus resulting to the Earth's near destruction.

The agony of what will happen, the unknown and the imminent dangers from space, comets and UFOs, are the creator's favorite subject matter. It is also clearly a favorite of the audience. One

cannot ignore the box-office movie hits like 'Deep Impact',

'Armageddon', 'Star Wars' by George Lucas and many others. The

virtual presentation of Kali 'The Goddess of the Millenium' is on the same wave length.

KALI The Goddess of the Millenium^

AUTHOR'S EXPERIENCE

During the performance, the interactor experiences the anxiety of man's cohabitation with nature, as nature destroys man or the opposite and finally the hope of achieving a 'happy' co-existence.

Contemporary man of western societies sometimes feels robbed as he witnesses events that might be beyond his imagination. Work methods change and societies are dissolved. Jack Delblanc (1998), IBM CEO (Paris) refers to it as *"Even in large organizations, every employee will be responsible in creating his own career."* This phenomenon has already appeared in other countries and is becoming an everyday experience and is also being included in various academic programmes. This results in *"an economy that is based on knowledge that is characterized by inequality"*, as Robert Reich (1999) mentions, a university faculty member and minister in the Clinton government since 1992.

Life in the fast lane that man is forced to follow in order to conform to a social unit regardless of the consequences and the coercion applied in the attainment of the above objective are all factors that formulate contemporary man's way of life. This is also reflected in his artistic creations. The fast montage in the movie Pret-a-Porter and the rapid, even exhausting, narration style in the book "Neuromancer" by Gibson, (1998) all help create the aesthetics of speed and violence. They destroy serenity. Video games are another source of artistic expression that has adopted the style of fast plots and violent interaction.

This crisis also appears to affect the 21st century man's relationship with the divine. It is another important factor that operates on current forms of aesthetics. Previous religions do not ring true for the contemporary man, they only serve in further isolated him. Man

however continues to search for the truth in the meaning of his existence. This search led him to eastern religions and caused him to adopt eastern traditions. For example to train in martial arts or to meditate according to the Hindu beliefs. In sci-fi creations we notice that the creators suggest cultural approaches that also stem from eastern traditions. In such movies there is a merge between modern technology and eastern philosophies.

Lucas and his film 'Star Wars' is again referred to, in which the Jendi are the spiritually advanced nation and the civilization that have developed the philosophy of existence.

- **Other similar virtual performances have also been examined in this research. Their majority refer to eastern religious stories.**

'Through his futile search for the absolute, man attempts to escape from reality. This is obviously unattainable that therefore creates an unending confusion. Thus we have a serious crisis in the western civilizations'.⁵⁵ Steiner, (2000).

This crisis finds its way out though drugs, psychoanalysis and the pursuit of alternative realities.

- **This development of the virtual reality through technological innovations seems to be the favorite escape-route for the man of the next decade⁵⁶.**

As David Cronenberg depicts in his movies and especially in his movie 'EXISTENZ', the virtual environment is a way for the user to experience imaginary events of his desire through the computer.

"The supreme power of the contemporary man is really frightening." Topali, (1999).

As technology progresses, man's spirituality increases. This however is a result of the cultivation of one's soul.

It is also noted that the lack of education and especially cultural development has resulted to the fact the masses form their aesthetics in conjunction with current trends that dominate each period. Most works of art are similar imitations that do not reflect the creator's inner being.

Even the public does not have the disposition to accept new ideas and questions the appearance of some new trend. This occurs due to the fact that his lack of knowledge does not allow him to assess works of art that are presented. Therefore, he remains with what is projected by the media.

- **Marketing leads this game in the matter of the aesthetic development in this era. Marketing rules how the masses live.**

2.3.3.1 Cross Cultural Phenomenon

According to the professor on International Relations of Harvard University, Samuel Haddington (1999) the below large cultural groups exist: the West, Confucian, Japanese, Islamic, Hindu, Slavo-Orthodox, Latin American and African. All these elements appear in the concept of the Mitologies performance. In the near future, the above groups will conflict, possibly resulting either in division or unions between them. In either case, interesting cultural results will emerge that will prepare the ground for the cultivation of an international culture. Examples are multi-national companies that promote their products in the same way throughout the world. The results have already appeared. The way of life and daily experiences that one meets in Tokyo are similar to those met in New York. As Benjamin Barber states in his book *Jihad versus Mac World* (1999) *"the same images, sounds, brands, products in all five continents. Coca-Cola, Levi's, MTV, music, cinema, TV all emanate the identical aesthetics of international consumption."*

The entire world has become a community that is bombarded by the mass media that formulate ones conscience and aesthetic values. Let us not overlook the current trend that stipulates that everything is poorly -made from home appliances to us ourselves. This creates prototypes, correctly or not, that affects the aesthetic development of society itself.

The society is about to experience the feeling that all members of the society play the leading roles in the same movie. The audience will escape through the virtual environment performances as well as the artists themselves as during the creation of their works they are driven to psychoanalysis. As the psychoanalyst, Helen Tzavara mentions, *"Art will probably be a form of self-healing."* (Personal communication on 4 April 1999).

The objective is inner peace and man is indifferent to whether it is real or not. This is what provokes cultural creation in this century. With the assistance of digital technology, the artist is able to express himself through the 3D environment and to reproduce his inner world.

- The message of modern times is that man has freed himself from the medieval bonds by setting himself free from no one else but himself. This freedom is presented through individualism and subjectivism.
- Education, knowledge and the ideological identity of contemporary man are the elements that provide his individuality and the possibility to form himself in conjunction with global culture.

A "cultural intermingling that will provide its tomorrow's habitants the right to belong to numerous worlds in only one lifetime." Hurbert Hugo (1992), mentions.

Everything evolves. Economies, production and materials have become simulated. The entire capitalistic system that has been overturned due to globalization and for some years now operates separately from actual production. Information is created and transmitted by a privileged few. Predictions were made that the globalization through the Internet will reduce poverty and racism. However, society is witnessing the materialization of Michalis Dertouzos' prediction (2000) that *"the information market will widen the chasm between the rich and poor, on a national and individual level."*

We therefore still have social inequalities in every social system. The only change is that the primary role is held by information in contrast with the invention of the wheel in the fourth century, the steam engine at the end of the 18th century and electricity at the end of the 19th century. The IT revolution thus changes man's behaviour and existence.

2.3.4 Economical Influence

The economical factor is combined, in an indissoluble fashion, with society's functions today and in the future. *'Artists who practice what is called media art have to tackle their work are expensive to produce and difficult to pay for'* Paik, (1992). More specifically, everything evolves around money. Therefore creators attempt to create works that have a marketable and artistic value. This occurs due to the fact that works created by digital

technology have a high materialization cost. Only a few creators can operate independently from the assistance of university or research funding schemes. In these cases, further to the value of the actual result, the works marketability is not an important issue.

- **These are the reasons of opposing current trends and their art deserves its future development.**

Past technology played a great role in the expansion of art with the invention of printing and photography. Today and in the future, the development of electronics will also play an important role in art's progression. It provides artists with the tools, such as computers, to experiment and to present new forms of expression through the same technique. The term technique is used at this point in order to describe the ways the creator uses his materials, more specifically the software and hardware. Software as other materials provides the artist with new means of expression.

The fast and continuous pace of technology opens up new roads to cultural development that also affect art. This does not only reflect means of expression but also the artist's sources of inspiration. William Gibson's "Johnny Mnemonic" (1980) was inspired with technology's development and its effects on future society.

2.3.5 Technological Influence

The masses face the phenomenon that art and technology progress along the same path and jointly create new forms of expression and a new language of communication called interactivity. Now the creator invites the audience to take an active part in his creation and to decide in the plots development.

Furthermore, the creator can originate from the world of computer science or simply be a traditional artist that has stumbled across technology. As Ian Lipner states, (2000) "Artists are becoming nerds and the nerds are becoming artists and the audiences are becoming excited. What are they excited about? Virtual Reality".

Our society today is based on fierce competition. This social-economical model that we are exposed to is established on the laws of supply and demand.

We are living in an age where *"politics serve the economy"*, (Galiberti⁵⁷ cited in La Republicca, 1999).

Furthermore, economy depends on technology. The Internet is a point of reference for this digital age that is emerging. Most of contemporary man's dealings are carried out through cyberspace, such as e-commerce, e-education or e-art.

The Internet is considered to be one of the biggest architectural innovations as far as the transmission of information is concerned. This electronic tool of transmission creates the aesthetics of the medium.

The use of computer networks creates flexibility in the flow of mass movement.

It is a tidal wave that constantly changes, the inter-changeable magnetic phenomenon should be noted by the artist and art theorists. Research data can be drawn from the movies of Eisenstein. From these movies, conclusions can be drawn as the development of aesthetics. Eisenstein was a tireless intellectual and one of the few aestheticians of the 20th century that supported the need of the aesthetical reorganization of aesthetics.

The interaction and digital means that the creators have to face are used by their creativity that is directed by technological innovations and science fiction. Materialism, speed and violence in all their forms of expression are the parameters that convert the Baroque order into the 21st century.

This form that humans experience is introduced through the world of cyberspace, a world of fantasy where all forms of art are applicable and can be expressed.

With the innovations in the area of electronics, an industry emerges that has the power to formulate consciences. This same industry provides the pace of development in the economy and society in this industrial age.

- **The traditional tools do not allow a reciprocal relationship between the transmitter and receiver.**

Technically speaking, its coverage is limited to the lowest point of the system. We have the bureaucrats on the one hand and on the other the public and the dependant masses.

2.4 Endogenous Influence

As mentioned before, the influence of exogenous factors is horizontal (they act superficially) whereas endogenous factors have a vertical influence. This means that *'factors have a deep impact in creating the various levels of aesthetical reality'* Mourellos, (1985, pp. 42).

The most exogenous factor is aesthetics. It always appears integrated with art works and identifies with the work's meaning and artistic destiny. Furthermore, it is the element that can transform a simple action into art. It composes an autonomous and particular entity, whose characteristics should be independently examined.

2.4.1 Aesthetical Values and Symbols

Every natural phenomenon remains objectively the same. However, its meaning changes according to society's approach, which provides it with element of subjectivity.

An artwork can be viewed in the same manner. For its better comprehension, its symbols must be examined. With its transition from one culture to another, the symbol's meaning changes. For example, this occurs with colours and the symbol of mourning. In western cultures, mourning is symbolised with black, whereas in the East, it is symbolised with white.

In the same way, art changes substance and from a magical happening it was transformed into an aesthetical object. Even the phenomenon of art's development, from one form to another, (from frescos to virtual performances) and the influences of certain art forms in a specific period, is in itself a problem related to the sociological effect on the creation of art works.

This occurs, as each artist forms his personality on the social values of his society. He accumulates experiences and knowledge from his social environment.

- Therefore, each art form depends on a social environment.
- Each era or culture has its own aesthetical values.
- Art is a social phenomenon which has its own laws of development.

2.4.2 Morphological

Form and style are the elements that allow the distinction between art forms. With the term 'style', the author refers to style in general, and not to the personal style of each artist. In other words style is seen as the characteristics of the art of a certain period. The art's subject-matter also plays a vital role.

- **In reality, form and subject-matter compose a separate entity.**
- **Both form and subject-matter are combined with a society's predominant aesthetical climate**

Themes remain the same over years, what changes is how the themes are approached and depicted. Ulysses' journey (Homer) for example, has the element of vertabrated stories that metaphorically describe Ulysses' journey of knowledge for over 10 years. It is an adventure of the spectator's soul. The same subject occupies contemporary artists and spectators, a fact that is verified by the subject-matter met by spectators of virtual performances, e.g.

Robots + Avatars dealing with Virtual Illusions.

AUTHOR'S EXPERIENCE

In this performance, the spectator enters into the adventure of good and evil through the symbol of Ying and Yang. During his wanderings in the performance, he is able to experience conditions and receive stimulations that will make him think and search within himself.

All art, even though they might seem different from previous forms, stem from forebearers of virtual performances, such as the theatre and cinema. For this reason, it is obvious that the history of aesthetical forms gives priority to the style and form, as for example to the plot that developed throughout the performance. Naturally, these are not the only characteristics that identify the individuality of a virtual performance. The characteristics of the society in which the art develops must also be considered. Without a doubt, the style of a specific era is composed of the structure of all representative works, as for example:

- **The interrupted narrative flow which is noted in virtual performances**

This characteristic dominates all other forms (characteristics) to which they are subject to (colour harmonies), even though an art work might differ in its inspiration and content.

- **It is the interrupted structure that dominates a virtual performance, despite its lack of absolute definition**
- **Each era has its own morphological characteristics and aesthetical structures**

With the study of the origins of virtual art, the three stages of an art form's development emerged. These stages can be lengthy or brief:

- **The first stage is a preliminary phase**
- **The second is a experimental phase and**
- **The third is the empirical phase which composes the mature phase of art**

In this case, VEs are at the second experimental phase as aesthetical forms are still being organized in space and structured in time.

- **Space and time are the main elements that an artist uses to create aesthetics**

These two important elements, together with the subjective element of the artist and the audience, can create a form of aesthetics through the art of virtual performances.

Therefore, the aesthetic form is presented as an endogenous factor that governs aesthetical structures as they are autonomous, and it expresses the language of Virtual Performance art.

- **The characteristic of the form that governs art, determines its autonomy.**

Despite the morphological element which composes one of the endogenous factors that characterize every type of artistic expression, the next section also examines the second endogenous factor which is aesthetics, a result of social development. More specifically, the virtual performance relates to a specific process, aesthetics. Aesthetics stems from social life, even if it is the artists' personality that determines –its subsequent developments.

Naturally, it is not only language, form and content of virtual art that is associated with the ideas and emotions created by society.

For this reason, form is insufficient to determine its substance. The aesthetics factor simultaneously refers to form and content. Despite these two elements being spilt into two sections, for reasons of research, in practice they are closely intergrated.

Form and content compose an unified entity and the virtual performance draws its aesthetical value from their intergration. It is the harmony of form and content that stems from their nature, when content creates its suitable form. This probably is the most fundamental art criterion.

2.4.3 The Social Role of Virtual Performance Art

Beyond the criterion that stems from the substance of art, what is the aim of the aesthetical process on society and on the members of a sociological group? Is it, perhaps, the creation of beauty according to the Platonic approach, as a value that is derived from the successive modifications of art, an ideal of beauty which every artist attempts to depict in his work?

With a brief retrospection, it seems that the aesthetical factor is the pursuit of beauty. In artwork throughout the ages, many types of performances can be noted, as for example the Satyrs of ancient Greece, the demons of the Middle Ages up to the current aesthetics of sub-culture and gothic, that honour monstrous creatures from children's cartoons to sci-fi movies.

These forms stem from society, in other words, society stipulates the aspect of beauty. For example Spielberg's E.T., is an ugly creature with a rich inner world. The form of this creature would otherwise be repulsive or indifferent to the audience. The content however, of this small extraterrestrial creature made him into a lovable household name and provided the movie with an aesthetical value that allows it to survive over time.

Therefore, it is established that a definition of beauty cannot be created as it depends on the social ideals of beauty.

O Charles Lalaux³⁸ (cited in Mourelos 1985) supports that art plays a number of roles in society.

- **The first role is entertainment.**

In other words, with the spectator's interaction in a virtual performance, an interesting result appears between the participant and artists' mind and fantasy.

- **The second role of art, according to Aristotle (1999) is the theory of catharsis.**

This means that art plays a liberating role in conjunction with the artist and audience. This occurs as art which appears in virtual performances, allows the presentation of a spectacle that refers to the audience. This spectacle is composed of emotional conditions which are often more intense than those experienced in everyday life. The audience wishes to experience different encounters in a virtual performance⁵⁹ in order to escape from reality.⁶⁰

Mitologies

AUTHOR'S EXPERIENCE

For example, in everyday life, man does not interact with cultures and habits of ancient cultures e.g of ancient Crete. However, in the performance he experiences the sternness of the mythical figure (Minotaur) and the intense feelings of fear that emerge from him getting lost in the labyrinth or the facing the monster.

With the function of catharsis, aesthetical results are presented that stem from the participants' psychology.

- **The third role of art creates a field from which a technique evolves, having its own rules and regulations and historical development**

As it has been noted from section 2, the virtual performance operates and develops in the digital environment (medium). It has its language and operations, such as interactivity, non linear narration and the absence of the actors' presence, in the traditional approach to space. It has also been derived that the virtual performance was derived from other art forms which were integrated with technology.

- **The fourth role of art is man's need to create models of perfection.**

As an example, classical sculpture is referred to. With various experimentations, the artist attempts to reach perfection. Perfection however is a relative term as it is a subjective

condition. Therefore, creators of virtual performances initially attempted to reach an absolute and realistic portrayal. It is mans' inner need to reach the divine creation. Consequently, the expression of perfection, the ideal, creates aesthetics as it stimulates, in a variety or ways, the audience's emotions.

- **The fifth role of art is the reflection of social reality**

In other words, art offers spectators their social space. In virtual performances, this area is cyberspace, that, as previously referred to, is the digital environment in which man lives and creates.

Art often presents reality in obvious forms in order to highlight elements which will touch the participant and jolt him with regards to vital issues.

KALI The Goddess of Millenium

AUTHOR'S EXPERIENCE

The performance prompts the spectator to regards the earth's future in relationship to mankind. It stimulates the spectator of this virtual performance, to deal with the preservation of his environment, the planet Earth.

The virtual performance presents the inner image of the digital society. It is an aesthetical reality as the virtual performance is an art form that creates new (digital) worlds that have never existed before.

- **An aesthetical reality that enriches society's daily life.**

The artist experiments in order to examine and revive the world with the illusionary stimulations that it offers. It could be compared to impressionism as it examines and not imitates its subject-matter (plot and spectators' participation). *'What is of prior interest to the artist, is to deeply enter the relationship between the performance and participant in order to grasp this relationship as an aesthetical fact.'* (Franz Fischnaller, Internet communication in 2 February 2001).

3. INTERRUPTED FLOW OF INFORMATION

Virtual performances present the comment element of non-linear narration, which with the spectator's interaction, creates aesthetic result. These results have been developed by only a few art forms, which are examined in section 2. This form of aesthetics tends to be combined with the aesthetics that are presented through the volume and colour created by the virtual environment.

- **Therefore, the combination of both elements creates a unified aesthetical result.**

Through cyberspace, the audience experiences the reversal of the rules that govern the flow of a traditional performance.

- **This reversal of traditional experiences is based on interaction.**

The potential of interaction relies on the interrupted flow of information that the creator can present, via technology, to the audience of a virtual performance.

On the other hand, the audience can utilize the information according to his choice at any given moment.

By itself, this characteristic revokes the traditional meaning of aesthetics and introduces new questionings on the future aesthetics that have already begun to emerge in cyberspace.

- **The audience's dynamic involvement in a virtual performance is a necessary element that seems to characterise the development of tomorrow's aesthetics.**

3.1 Interaction

The spectator's ability to actively participate and experience the development of a performance's plot according to his choices, is an element that appears in this investigated art form, also providing characteristics that promote aesthetics.

The spectator, from being seen as an inactive participant and passive tool for the creator, has been transformed into a dynamic member of the virtual performance. The wide range

of possibilities that are available for the creator to combine his inspirations and the dynamic contribution of the spectator in order to jointly develop the performance's plot is a product of aesthetics.

- **This results in the awakening and constant motivation of the masses' conscience. A contemplative spectator is a dynamic member of his society.**

Moreover, this ability is the element that sustains and strengthens the post-modernistic theory.

3.2. Audience

The audience's involvement in the development of a virtual performance seems to be a crime against the 'natural state of affairs' that was the simple viewing of an artistic happening. This fundamental difference creates a new form of aesthetics that stems from the rebellion against traditional rules of art and aesthetics. It symbolizes rejection.

Every revolutionary movement attracts the public's attention whether it expresses power or weakness. Graffiti *'your presence on their presence...your pseudonyms on their stage'* Mailer, (1974) expresses a similar situation to the audience's interaction with a virtual performance.

In order to investigate whether an art form produces aesthetic results, it must be examined via the orthodox rules of aesthetics, such as the exogenous and endogenous influences.

A virtual performance materializes through the interactor's creative impulses whilst experiencing it, *'we can say that it is an art form of high standards'* Nuttal, (1969). Maintaining its position, a *'ritual'* can be distinguished in virtual performances that calls upon the audience to take on a dynamic and fundamental role in its development. A culture emerges, powerfully characterized by data transmission via non-linear communication and using representation as a mean of expression. Therefore, the exchange of messages is an expression that offers pleasure and this combination creates an aesthetical result.

In Mitologies, data are transmitted in which, via non linear communication, the interactor experiences feelings such as the pleasure of discovery, wandering or fear that he is lost in the Labyrinth. These sensations in conjunction with visual stimulations offered in the intricate rooms of the Labyrinth produce a significant aesthetical result.

The aesthetical result however differs from traditional performances as it was derived from the destruction of the known communication codes involved in such performances. A transformation is presented in dealing with such performances as the actor's presence is abolished and replaced by the audience itself. It is an extension, a modification of the code and the expression of creative impulse. A comparison of the symbolic state of structured phenomena with the flow that places the artist in the position to create in hand with his audience.

3.3 Body as Aesthetical Object

Art allows the artist to create a relationship between the virtual and real in which a relationship is built -a framework with the virtual in conjunction with the means of aesthetics. The aesthetic condition emerges from the physical body through its applications and even entertainment. In 'Traces' all the sounds and visual experiences are generated in real time based on the interactor's behavior which *'all attention is focused on the ongoing bodily behavior of the user'* Penny, (1999, pp.87)

Usually virtual performances operate through metaphors. With this procedure, the interactor can immerse into the intangible virtual world and can disconnect from his body (disembodied). *'When I first used a CAVE, I was fascinated with the visceral sensation of collision with virtual objects. I realized that part of the disembodiment quality of HDM VR was put because when you look down, your body is not there'* Penny, (1999, pp.86).

- **This factor can be considered to have historical importance, as it is the only art form that allows the most metaphysical communication with the audience.**

Naturally, it clashes with the opinions that place virtual reality in areas isolated from the socio-economical environments in which it develops. The virtual dance, 'Ghostcatching' (1998) presents movement without the bodily presence. The work is made possible by

advances in motion capture⁶¹ that allows the interactor to dance. His dance is translated into lines that transmit the rhythm and weight of physical movement. These are then interpreted into mobile points by the computer that result in a choreographic composition.

He realized that through 'emotional logic', most people in their daily speech did not present compound or logical sentences but broken, disjointed phrases that had to be connected in order to be understood. One of the most fundamental elements that create aesthetics of the Internet *'is an extremely elegant, nonhierarchical, rhizomatic global web of relatively independent yet connecting nodes'* Morse, (1998, pp.187). It is therefore a natural tendency of human functions to observe and compose ideas, knowledge and emotions. Based on this ability, he photographed reality and then fragmented it in order to produce emotions, people, music, light, movement and colour. *'He felt that the development of one emotion did not simply follow another. Both were interrelated and inseparable elements of a monistic entity'* Wollen, (1969, pp.39). As it has been perceived, the visible world is presented as an illusion. Performances are images that compose a momentary illusion during a virtual performance. The interactor is in a position to simultaneously feel and experience the visible and invisible world. This results in him having a spherical opinion of his inner and outer world. During a performance, he experiences both the virtual and real world, as the power of the real world is so great that it subconsciously cohabits with the world of illusion.

The censorship issue introduces a new era. The retort between the possible and the actual will be intense.

If the future leads to isolation on a personal basis instead of activating the masses, the position of the media will be strengthened, resulting in the public's total dependence.

The masses will be liberated if they realize the chances that the new tools provide. The virtual environment will stimulate the thinking processes of the masses because the audience needs to be actively involved in the interaction with the artistic creation.

4. AUTHENTIC ART

However, the phenomenon of reproduction copies also appears. At this point the question of the original work and digital copy is posed. Experts express their fears that *"the original work of art is in danger of extinction behind the digital copies –the simulation threatens to overrule the original."*⁶² Blumenfeld, Guerrin (1999). Even art will be industrialized and its traditional forms will cease to exist.

The authentic work of art does not need to fear its replacement by its virtual copy. Furthermore, the original work of art was created in a certain period and thus reflects the creator's feelings and the creative tools used in that time. The effect of the work on its audience is the inexplicable bonding the audience experiences during its viewing. The art-lover knows and senses which is an original and which is the copy. Authentic works of art interact with the viewer in contrast with imitations. Gioconda, for example, has been reproduced millions of times and these reproductions also create some feelings in its viewers. However, these feelings cannot be compared in viewing the original work in Lourdes.



The Snail, Matisse

Therefore it is important to consider the methods of creation in all art forms. Here it must be noted that the cinema is also considered art, a fact that is universally accepted. Even if a film is reproduced numerous times, the magic felt by the audience is the same. Consequently, the matter is not art in general but traditional art forms that the audience is used to experience live and not through

copies in books or photographs. Photography as all art forms emerged with the objective to exactly depict the world and works of art. However it slowly distanced itself from exact reproductions and independently developed its own artistic creations by altering the parameters of its identical representation. The personal element emerged –the opinion of the creator-

photographer. As mentioned in the second section, the invention of photography prepared the world for the evolution of visual philology,

At this point the author will object with the composer, Bruno Letore (1998), who believes that *"music can be written on a computer simply by using a mouse. Musicians will search digital sound libraries and will compose by 'copy and paste'.*

Actually it is difficult to differentiate an original from a copy with the assistance of current technology and the applications of copy and paste. It is a type of electronic collage that is not without artistic value. Besides, isn't collage art? It is, and has also been promoted by a number of artists. Such as *'The snail'* by Matisse⁶³ (1953). This work was created by a composition of painted pieces of paper that were cut and pasted on paper mounted canvas. This work was also referred to by Saul Bass⁶⁴ who supported the same beliefs as its creator: that collage was the most direct and simple way to express himself through signs. Isn't pop art a type of collage based on the reproduction of processed photography or patterns? Furthermore, isn't collage the repeated motives that emerge from the artist's paintbrush on the canvas? The artwork *'Constellation According to the Laws of Chance'* Arp⁶⁵, (1930), is a wooden collage painted in black and white. The play between various colours and shapes creates a balanced synthesis of high aesthetical results. The collage fragments might seem unusual and odd but they remain unchanged. They sort out things from the beginning in conjunction with their positioning in a specific area. This positioning rarely creates an explosive result. More often, subculture phenomena emerge via the industrial production of art (consumer goods). It is these phenomena that doubt whether art can be created in cyberspace.

It was a necessity to refer to all of the above because the author wants to conclude to the fact that it is a matter of expressive means and their potential.

- **As long as man uses his mind and senses he will create art with whatever means and tools available.**
- **Therefore, digital technology provides the multi-tools to experiment, create and express.**

The world has begun to impose its culture on the virtual environment. The interactive art in which the artist invites the audience to use interactive tools provides the user with guidelines as to his position in respect to the work of art. Naturally, copies will always exist for those that lack education and creative capabilities, but this is an issue that has existed since the beginning of our civilization. Original art still exists and will continue to be created by the tools available in each period of time.

The virtual environment can be projected as a transmission of reality. This directly leads to the interactive means and to means of immersion where artistic expression is compulsory. This is due to the fact that information is converted into electronic formations and then into electronic art.

Artists cannot ignore the fact that the audience has access to tangible means where information is processed, stored and transmitted. It is a transaction of terms and information by the media that aims to direct and control.

- **Therefore, the audience's interaction in the performance, must be considered by the artist in order to create a combined aesthetic result.**

5. CONCLUSIONS

With globalization as a starting point, the general and specific aspects on the evolution of an artist's life were examined. Artists that experience cyberspace compose a rather homogenous group but on the other hand they also maintain their uniqueness. This uniqueness depends on factors such as the general groups of artistic organizations, (galleries, etc.) and also their education.

- **All these components influence art and formulate aesthetics.**

Despite the influences that the artist receives, as he derives his inspirations from his inner being, his work presents a depth that reflects his knowledge and research. This composes the basis on which the work of art is created.

- **Through this research, new powerful forms of expression emerge that result in the creation of aesthetics.**

This attracts the audience and invites them to interact with the work at a deeper communication level, by coordinating themselves with the elements that represent them. There is no doubt that the creator is strongly bonded with the history of the society in which he lives and creates, as well as with its influencing factors. This is what Tain calls "a historical moment". (1985)

- **A historical moment of our civilization, at the century's turning point, is the technological revolution.**

The introduction of digital technology in all aspects of the contemporary man's life could not also affect artistic creation. In the virtual environment, the interactor has to collaborate with the creator and information technology. His contact with technology forms aesthetics according to Matthew C. Kirschenbaum, (2000).

Mechanical technology remains a more foreseeable development of modern technology that is actually the essence of modern metaphysics. Art operates beyond the limits of aesthetics.

- **A work of art becomes solely an object or a subjective experience.**

Therefore, art is considered to be an expression of human life.

- **Human activity is captured and the finished product is culture. The meaning of this is reformation. To reform oneself, becomes the objective behind culture and this is what is projected in digital art.**

The aesthetic direction of digital art is hard to be analyzed as in it still in embryonic form. The aesthetics that have emerged in the developed societies can however be located. Through art that is nonetheless industrialized but still exists and progresses, develops the artist's creative fantasy. Art is a "*natural discipline*" as Reed, (1978) believes, '*that results from observation of the universe from which it borrows its rules*'.

- **These rules will be overthrown and replaced by others in order to continue its existence. It is an infinite research.**

- **The expressive means used by the creator are of little importance. What matters is whether he can use them effectively, in order to produce aesthetics.**

An existing difference is that with digital tools there is no element of continuation. This fact is a vital aspect for survival of works of art that are created with pixels in the digital environment and not on a canvas or other conventional materials.

- **The user in a virtual performance has the chance to follow his own path according to his perceptive choices.**

The interrupted flow is transformed into a continuation by the audiences' interaction in the virtual performance. This is achieved with the selection of a choosen route through the performance, an issue that produces authentic results of vital aesthetical importance.

In section 4, an attempt is made to identify the elements that characterize a virtual performance. In other words, how the artist can handle the interactive element and create perfect condtions of immersion for his audience.

Art in the VEs is the installation that a virtual performance offers in which both body and mind are involved for its materialization. The result is the experience of knowledge.

The design of virtual performances is based, from a design and colour point of view, on traditional ways of space arrangement. The new factors that have emerged and that will be developed in the following section are:

- **Interactivity**
- **Interrupted flow of information**
- **Ways in which creators materialise their ideas by using the above tools.**
- **The opinion that the spectator forms by his VEs experience.**

C O N T E N T S

SECTION FOUR

1. Introduction	99
2. Tools	100
2.1 The Role of the Computer Technology	100
2.1.1 Hardware	100
2.1.2 Software	103
2.2 Spatial Instruments	104
2.2.1 Time / Space	104
2.3 Idea	105
2.3.1 Narration	107
2.3.2 Agency	110
2.4 The Virtual Scene	112
2.4.1 Visual Elements that Consist the Virtual Scene's Synthesis	113
2.4.2 The role of Software in the Construction of VS	115
2.4.3 Realistic Representation.	116
2.4.4 Design	120
2.4.5 Colour	123
2.5 Immersion	126
2.5.1 Metaphors.	127
2.6 Navigation.	129
2.7 Interaction	132
2.7.1 Movement.	136
2.7.2 Juxtaposition Effect.	139
3. Audience	140
3.1 Communication between Artist and the Audience.	144
3.2 Point of view	146
3.2.1 How Artist Manipulate Physical Body in the Virtual Space	147
4. Conclusions	149
4.1 Aesthetical dimension. of Virtual Performances Implementation	150

SECTION 4

How can the aesthetical dimension of VEs be implemented

1. INTRODUCTION

In the first section, the historical data presented indicate the origins of this developing art form and the characteristics that also classify VEs as an advanced art form.

This section attempts to discover the manner in which the characteristics of the art that emerges in a virtual environment can provide artistic results of high aesthetical value. The presented results originate from primary data (case study findings, interview results from VEs participants and by the author's experience on virtual reality performances) and secondary data (bibliography).

Comments are made on how artists must act in order to create a work of art in a virtual environment that satisfies the aesthetical nature of art. Furthermore it investigates the roles of the artists and the audience in such performances. Also analysed, are the abilities they should have and in what ways these abilities should be utilized in order to create or experience such performances.

In this section, the research results are analyzed in association with the interactive immersive design of art VE performances and the design of traditional performance. Elements are presented whose use can create the foundations of an interactive construction. An interactive process is a complex matter and its construction demands the interplay of all art forms, as argued in section two. To date, artists involved in this area, face works with a research perspective retaining however the traditional aesthetic values and creative structures.

A closer example are performing arts such as contemporary theatre, interactive cinema and moreover 3D animation and video art installations, that utilize form, colour and also the synchronization of sound and image in a similar fashion.

These possibilities are enriched by information technology that provides the potential for further development in areas such as the virtual environment, a matter investigated in this research.

2. TOOLS

In this study, elements such as the computer, idea, scenario and virtual scene are considered as tools used by the creator in order to construct a virtual performance.

2.1. The Role of Computer Technology

Cristian Hubler, (1992) refers *'that artists are not interested in facing the computer as a memory tool'*.

2.1.1 Hardware

In the beginning of their existence, computers were extremely slow and printers had poor results. Images were created by lines. In time, computers and their peripherals improved in performance and provided new opportunities for creators dealing with the 3D environment.

'To day, however, virtually all computers are able to create pictures of some sort, and are therefore potential candidates as a VR platform', Vince, (1998, pp.72). All machines have the ability to create images for the virtual environment, if they fulfill the appropriate requirements. Supercomputers⁶⁶ and real-time displays in CAVES are more frequently used in the creation of virtual performances as they offer rendering speeds. However it still cannot be said, those developments in the area of these systems have been completed.

Robots + Avatars dealing with Virtual Illusions

Technical specification

- The installation is carried out in the C language with Microsoft Visual C++ -Windows NT 4.0.
 - The part dealing with the graphic has been developed with the VC Division library. For the execution of the application it is necessary that the DVS Division runtime component is installed with the required characteristics.
 - Other components necessary for the adequate functioning of the application are: (two) analogous joysticks and the corresponding drives.
 - A joystick permits the entry into interactive contact with Koala and its avatar Ying...whether in the real world or in the virtual world. The second joystick permits the entering in contact with the two worlds: the real world of Koala and the virtual world of Ying and Yang.
 - Interacting with these two joysticks and these worlds... interactions, collisions and encounters are generated which permit the entry, exit the discovery of new worlds all in function with the laws that govern actions and reactions of the three personages of this installation. During this walk, there is set in the form of an invisible grid a sort of "world-map" of sites, which will be called up with a ping to the corresponding positioned website existing in the database.
 - The database of the weblinks: about (suggested) 100 http addresses will be defined and stored in a database and than localised in the invisible grid of the VR-world. For the very moment the avatar crosses over this link, he will create a connection to the site and if the connection happened to be successful a flag or something else will be visualised on the screen.
-

A computer is a tool which in some ways may be compared to canvas, marble, the piano or speech. Only it isn't so simply depicted as man has yet to be familiarised with its contingencies. It depends exclusively on technology. The artist that will experiment with this tool will have to be aware of its properties and capabilities in order to make full use of them and to be able to fully express his ideas.

Carl Sims, (1992)⁶⁷ claims that *'The goodness or successfulness of an image is much more complicated than simply complexity'*.

Some analysts state that the construction capabilities that are provided to creators depend on technological developments. A researcher must not forget that technology applied today for the creation of works of art also depends on previous digital developments.

Technology does not provide the ultimate assistance to the contemporary artist to photographically portray nature. For example, till today technology is limited in allowing the artist to line an area with grass or to create trees. It is prohibitive in creating large files that need many render hours. This problem can be helped with fractals.⁶⁸ Today's and future technological developments continue in order to allow more capabilities in the creative field that occupies this research.

The computer today is a fundamental part of our lives. It is a tool that is essential to everyone. For the contemporary creator, the computer plays the role of a multi-tool as it provides the capabilities to produce, process sound, image and also recently scents. In virtual performances, the computer and its peripheral systems is responsible for the construction, experience and development of the performance itself.

- **In actual fact it is an instrument for storing and manipulating data.**

Today, artists and spectators develop digital societies, possess computer knowledge and use that knowledge for most of their daily duties.

- **This tool is responsible for the production and transmission of information.**

Information is circulated with sound and optics so therefore the role of visual artists is continuously becoming more demanding in order to present more aesthetical results. Consequently, for the artist the computer is transformed from a simple tool to a medium of expression. They have the ability to formulate their ideas on the screen or in the digital environment where the event takes place such as 'Robots + Avatars dealing with virtual illusions', where the performance takes place in complex environments and virtual worlds.

- **Moreover it appears that the artist and audience, must act as a tool in order to transfer facts that cannot be transmitted in any other way or with as much success.**

2.1.2 Software

The artists that wish to approach art through the virtual environment must understand the parameters that play a primary role in information transmission. The artist's aim is to depict the world as he feels or sees.

- **Movement and interaction are important elements in this depiction.**

Technology offers the ability to present ideas which could not be presented with traditional means of expression.



Liquid Views

An example is the performance '*Liquid Views*' (1993), in which its creators used the Myth of Narcissus to present the relationship between the visual performance and its mirrored image. *'The narcissistic discourse is brought up to date. The world behind the mirror is regarded as untouchable; in painting, literature, and film it was entered only symbolically'*. Schwarz, (1997, pp.108). Computer and software technology offered the ability to create a liquid virtual environment that allows one to enter his image in the virtual environment in order to experience the ancient myth more intensely.

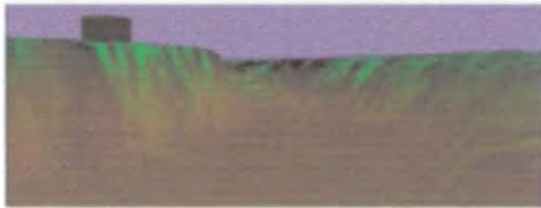
Contemporary artists who experiment with the virtual environment, must first focus on the idea-concept, develop a good relationship with the object they will deal with, and then materialize the idea via the computer and available technology. It is in the artist's nature to promote the art form he serves. He is therefore called upon to provide solutions, especially if his aim is to investigate areas that are not covered with existing software.

- * **For artists, the computer is a powerful aid in expressing their ideas. Without computer technology, VEs performances cannot be created.**

2.2 Spatial Instruments

Robots + Avatars dealing with Virtual Illusions

AUTHOR'S EXPERIENCE



Amazon City

The environment of Amazon city is a landscape, which is generated as a 3D surface mapped with a corresponding texture. Depending upon the different areas/zones the outlook changes.

The creator uses the same tools to create his work in the 3D environment also with interactive possibilities. These basic tools are space and time, followed by other auxiliaries a creator might need to complete his work, such as light, sound, scent and software/hardware capabilities.

On the part of the participant, devices such as, the CAVE, gloves, a 3D mouse, head-mounts and shutter glasses are used to experience the performance.

2.2.1 Time/Space

Physically all things and events are located in time. Nowadays, when sculpture is attacked by air pollution, we notice with dismay that even steel or stone moves on a lifeline of its own, which distinguishes its different state to day from that of yesterday. Psychologically, however, a statue is beyond the element time.

- **However, the timing of a virtual performance does not have to correspond to real time⁶⁹**

The tools of space and time are employed by the creator in order to present the information he needs to share with the audience in a specific time period '*Time has become another colour on the artist's palette*' Vince, (1992, pp.163). Hence we have the production and transmission of an idea in spatial time and the tools used are referred to as spatial instruments.

Picasso's Harlequin is a spatial display of a single moment. Despite the fact that a spatial instrument is a spatial display that increases geometric elements and symbols, as an

astrolabe-like device, whose appearance is dated to the 2nd century BC⁷⁰, it is an instrument of high technology. Some parts of the instrument are mechanical and similar to an ordinary watch, only it has the ability to interact with the universe and calculate astrological positions. Simulators can also be considered to be spatial instruments as they can transmit geometrical, symbolic and dynamic information. Geometrical information, apart from navigation information (azimuth) can also assist communication between the participant and instrument. The same occurs with symbolic information that refers to the present or future position or hero's representation (Star War navigation device).

- It is apparent that symbolic and geometrical information are linked, and with the help of graphics, produce accurate images that communicate perfectly with the participant.
- Virtual representation presents images of specific areas with actual components. To maintain this impression, an image's reproduction must take place in real time in order to have a dynamic representation of the area that the participant experiences.
- Spatial instruments referred to in this research all have interactive capabilities.

2.3 Idea

Artists must have strong traditional ideas in order to apply them to the new techniques
Dietrich Jeffre, (1992)⁷¹

'Art is the person who creates it'. Furtwangler, (1998, pp.98)

The creator is the only person that can present an opinion in his work as he has his own means of expression and thought.

The stimulation from the environment activates the artist's abilities to express his opinions through his creation.

Thus a work of art is an opinion, the point is how and in what way this opinion is expressed. Furthermore, to what degree is this opinion a reflection of the artists' inner world, moreover, it is well known that in art there are no rules only feelings.

Art that develops in the virtual environment is a conceptual performance, in other words it deals with the issue of concept– idea. Ideas replace a historical or social framework and the performance's aim is to present the idea as an activity or perceived experience. *'Conceptual art is an extension of the work's need to create and reach its objective. Art becomes conceptual, when no common practice exists.* Saltsman, (1983, pp.267)

The nature of the idea, its origins and presentation is reduced to the general problem of questioning the existence of life. This is a question that refers to creation of anything that moves in any kind of space. The creation–idea is the totality of stimulations received by the senses. It is the result presented with the perception of the surrounding environment. It is whatever the artist creates, stemming from inner or exterior stimulations. In other words, it is a life product.

The idea is transformed into forms that are intergrated with volume, colour and their movement in space at certain moments.

Therefore, the creators' concern is to produce a work of quality, whose sole qualitative criterion is 'its clarity'. Andronicos, (1952, pp.45). More specifically, the clarity of its meaning and messages that are presented during the performance.

The idea is transformed into action, shapes, special effects and sounds. It informs with clarity the participant, that all elements in the action are connected at a specific moment, by size, colour, movement and time in the area of a virtual performance.

- **Virtual performances are based on ideas-conditions that might or might not materialize. It depends on the spectator's level of participation, a characteristic element of conceptual theatre.**
- **The clarity of the idea's and message's design, must be considered in every performance.**
- **Space and time are factors that the artist must consider during the creation of his work. Firstly he must have the knowledge, know how he will construct the activity area from the geometrical point of view and also the historical narration that he might present. Furthermore, he must contemplate and determine activity not only**

from the linear but also from the interactive point of view. Finally the author- artist must also determine the work's visual presentation.

- The question of life and human's existence, as a general issue, is behind the idea, and influences the idea's background and how it is formulated. This question reflects queries about everything that moves in space respectively to the work's creation.
- Creation—the idea includes all stimulations that are received by ones senses. The scenario is the result that is presented from the perception of the surrounding area. It is what an artist creates from external of internal stimulation; it is a product of life.

2.3.1 Narration

Mitologies

AUTHOR'S EXPERIENCE

The title *Mitologies* is a word-game: a synthesis of the word *mitos*, which in Greek is the thread: the ball of string, that Ariadne gave Theseus to help him find his way out of the labyrinth, and mythologies. The scenario developed into a concept with characteristics that create for the spectator immersion conditions that will 'immerse' him into the performance. The concept behind *Mitologies* was to blend elements from different sources and explore their interconnections. These connections are therefore central to the unfolding of the narrative. The artists have carefully structured the participant's immersion into the environment. The performance surrounds the participant who acts according to his desire. The experience of the transferred participants in a well-developed virtual environment, that fulfills the requirements mentioned in the previous section, such as interactivity, stimulates their senses pleasantly or unpleasantly and immerses them in a world of fantasy. They have adopted the format of a visit, which is a metaphor in order to establish a boarder between the virtual and the real world.

Contemporary artists that experiment in a virtual environment must first focus on the idea-concept, as referred to in the section on Idea, develop a good relationship with the object of their thoughts that they will present and then materialize this idea through the computer and other technological mediums. It is in the artist's nature to conduct research in order to promote the form of art that he uses. Thus he is called upon to carry out research and provide solutions especially to his dreams and investigate areas that are not covered by existing software.

What are the elements that allow the creator to formulate his idea and participants to surrender to the enticement of a virtual performance?

- The creator's main concern is to present his idea to the spectator. The idea's development into a scenario is attained by authoring, which is the participant's ability to add alternative solutions to the performance, regarding interaction, timing and the number of access choices.

VEs create the means to pass from the natural world into the world of the user's perception which is '*located on the threshold between external reality and our minds*' J.H. Murray, (1998, pp.99). In the performance (case study one) the participants follows an adventure and knowledge game that includes metaphysical and allegorical elements of heterogenous nature such as renaissance, revelation, etc. This antithesis creates a wide field of knowledge and sensations that spring from the virtual world of fantasy.

Mitologies

AUTHOR'S EXPERIENCE

Mitologies scenario starts with an entrance and ends with an exit. Which could be compared to the beginning and end of traditional performance's narration. The narrative starts out in a linear fashion, a structure fairly unknown to virtual reality work, but familiar to us from other media such as film or book. The participants that enter the



The entrance

CAVE are initially located on the bank of a calm river. In the background, one bears noises of a wooden boat creaking and waves lapping on the riverbank. The boat slowly appears and the participant begins his journey on the river. In the physical space of the CAVE, two benches are placed in a way that corresponds to the virtual benches of the boat. Thus the illusion of travelling in the boat is very strong, as the

viewers can look down at the floor of the CAVE and see the virtual boat rocking beneath their feet. As the participant progresses on the moving platform, he experiences the peace of floating on water.

- This is the performance's first scene. Actually it is the entrance into the virtual world.

The boat could be considered as the 'fourth wall'⁷², a fictional threshold vehicle that carries the participant into the immersive world.

In the next scene, the creators abandon the boat and river and with then the linear narrative fades slowly into the unfolding narrative. The participants disembark on the level of a large garden and a wand allows them to wander and investigate the area from a ground and aerial view. Eventually they enter the mosque in which is the entrance to the Labyrinth. The labyrinth is a web, with several paths, every path connected with each other. It has no centre, no periphery, and no exit because it is potentially infinite. As the participants progress into their adventure, the dramatic tension builds from small knowledge surprises such as the geography room, *'one of the curiosity*



The garden

or study rooms found in the labyrinth is the geography room, that displays the lure and fascination of an antique very popular in the middle ages'. Medieval mapmaking stresses beauty over accuracy and hints of information, thus creating a mounted sense of anxiety of impossible escape. The feelings of anxiety such as in *the Torture of St. John* "is one of Durer's more unusual looks at biblical mythologies", are followed by the feelings of euphoria and curiosity for further knowledge. In this psychological game, the participant wanders around in his attempt to find his way out of the labyrinth.

• The ultimate result is to accumulate knowledge from his wanderings in the labyrinth's various rooms.

The last room of the labyrinth is the final destination of the journey, the finish line. The participant enters at the narrow tip of the room and circle around until they reach the centre, where the meeting with the minotaur himself takes place. Like the theatrical stage, the adventure of the participants into the Mitologies performance, is calculated to look as if it had a fuller existence, even though the illusion is meant to be seen only from particular angle and in carefully timed momentary glimpses.

Therefore the narrative structure in Mitologies has been successfully designed in which the authors have created a labyrinth that develops into many levels and rooms. It is a difficult

environment, full of dead ends, questions and queries that await solution. The adventure demands many hours of interaction to discover the solution (the way out). The Solution is the end of the narration, according to Aristotle, is the part of the plot that should be known to the authors from the beginning.

- Its importance is vital, as it is the element that draws the interactor and involves him in an intellectual activity that offers him the joy of investigation and discovery. This is the eternal problem of mankind, stemming from man's philosophical queries on the matter of his existence.
- The scenario must be developed into a narration with characteristics that create for the spectator immersion conditions, such as the surrounding environment and the format of visit, which is a metaphor in order to establish the line between real and virtual
- During the performance's narrative progress, the spectator faces moments of dramatic climax or decline according to what he is experiencing
- The spectator must be questioned in the scenario, in order to select paths that will lead him through the drama's plot, to the performance's conclusion, the solution of the narrative's myth.
- The artist main concern is to present the idea to the audience. The scenario development is attained by authoring, which is the participant's ability to add alternative solutions to the performance, regarding interaction and the number of access choices.

2.3.2 Agency

'In the purely Aristotelian sense, an agent is one who takes action. In Social and legal terms, an agent is one who is empowered to act on behalf of another'. Laurel, (1990, pp.359)

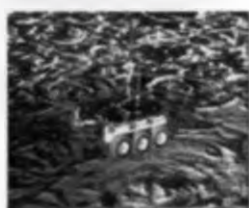
How the participant will move in a surrounding synthetic environment is a problem that writers are called upon to solve. Furthermore, the agency⁷³ problem rises, as to how the artists will create the agency sensation. From experiencing performances and verifying results by interviewing spectator that also experienced the performance, the following conclusions were drawn:

- In the *Mitologies*, this sensation is intensified with the participant's activity, since actions are highly autonomous, selected from a large range of possible choices in the rooms of the labyrinth that determine the course of the performance and the acquisition and synthesis of knowledge.
- The *Mitologies* performance presents the ability to the participant to wander from virtual room to virtual room. This element stimulates the spectator into enter more deeply into the historical development, independent of the content of the environments such as, -the 4-colour door room-⁷⁴. The above description is one form of agency.

On the other hand, one notes a type of narration that doesn't follow a certain structure. It bears similarities to various scattered photographs of different subjects that have to be put into a meaningful filing order.

- This process has no beginning or end, a perceptual attempt of thousands of combinations.

This type of narration is met in the '*Robots +Avatars Dealing with Virtual Illusions*', in which the participants can interact with each single robot in its environment, by moving a joystick. The participant could enter and abandon different cities (and enter again into the Mother City, which in turn contains the rest of the cities. The scenario must be developed into narration with characteristics that create for the spectator immersion conditions:



The Robot

- Dramatic climaxes and anticlimaxes.
- The audiences's ability to select paths.
- Kinds of tasks an agent might perform that are separated into four categories:

1. Information

The information which is necessary for interactor's participation in a virtual performance are: The search and wandering in the performance, the ability to determine the plot's development with the replacement and filtering of information and finally, the ability to exit from the performance.

2. Work

The programming, organization, reminders and guidelines that allow the interactor to comprehend the concept of the performance and to participate.

3. Learning

All the available information on the user's training and assistance in interacting with the performance.

4. Entertainment

The conditons that allow the user to participate in the surrounding performance or to create and experience aesthetics, are produced by himself in collaboration with the artist.


- Elements that sythesize a virtual scene are objects such as images, sounds and special effects.

This process of coming into contact, navigating and interacting with the city is being done through the narrative form called '*tangled rhizome*'. Murray, (1998, pp132).

- It is the narrative form that allows each narrative point to be interconnected via a central point. The characteristic of such a narrative form is the participant's experience of everduring involvement with the performance.

2.4 The Virtual Scene

'The new art form allows for the creation of complete environments'. Scott Fisher, (2000)

Robots + Avatars dealing with Virtual Illusions	AUTHOR'S EXPERIENCE
 <p data-bbox="387 1809 513 1835">The Boch City</p>	<p data-bbox="739 1577 1319 1847">which is generated as a 3D surface mapped with an appropriate corresponding texture. Depending upon the different locations the outlook changes. It consists of a real and highly aesthetical and spectacular stage design under the form of an Arena with labyrinthine pathways, made of mirrors, metal, wood, in a shiny colourful sand and stone-landscape. This is the habitat in which Koala lives and moves in Robots + Avatars virtual performance.</p>

2. Work

The programming, organization, reminders and guidelines that allow the interactor to comprehend the concept of the performance and to participate.

3. Learning

All the available information on the user's training and assistance in interacting with the performance.

4. Entertainment

The conditons that allow the user to participate in the surrounding performance or to create and experience aesthetics, are produced by himself in collaboration with the artist.


- Elements that sythesize a virtual scene are objects such as images, sounds and special effects.

This process of coming into contact, navigating and interacting with the city is being done through the narrative form called '*tangled rhizome*'. Murray, (1998, pp132).

- It is the narrative form that allows each narrative point to be interconnected via a central point. The characteristic of such a narrative form is the participant's experience of everduring involvement with the performance.

2.4 The Virtual Scene

'The new art form allows for the creation of complete environments'. Scott Fisher, (2000)

Robots + Avatars dealing with Virtual Illusions	AUTHOR'S EXPERIENCE
 <p data-bbox="390 1782 518 1814">The Boch City</p>	<p data-bbox="741 1559 1333 1825">which is generated as a 3D surface mapped with an appropriate corresponding texture. Depending upon the different locations the outlook changes. It consists of a real and highly aesthetical and spectacular stage design under the form of an Arena with labyrinthine pathways, made of mirrors, metal, wood, in a shiny colourful sand and stone-landscape. This is the habitat in which Koala lives and moves in Robots + Avatars virtual performance.</p>

- In the virtual world the performance scene seems to play a primary role. The creator during the synthesis of an idea has always in mind a scene in which the performance will be played.
- The VE is the simulation area in which the performance takes place, an environment for human involvement.
- A sequence of scenes or an interactive experience of the participant by using computer controlled devices.

In the computer there are two image categories. The first image category that is produced with raster are photographs that have been scanned into the computer, such as in Kali performance, in which the interactor finds newspaper headlines with the news of war, of destruction of man destroying man, man destroying nature. Images (bitmaps) which appears in front of him like a virtual screen. The second category is composed of images that have been created with vectors, such as the DNA virtual representation in the gateway B of the KALI performance. These images have the ability to be enlarged to any size without distortion that occurs with bitmaps.

- Another function that the creator must consider is antialiasing, evenness. An image is created by vectors that produce sharp-edged shapes, without curvatures. Here the function of antialiasing softens the surfaces. The ultimate aim is for a more realistic effect that suits human depictions as curves and not lines and angles exist in surrounding nature.

The environment of a virtual performance cannot operate alone. It must be supported with elements such as 'buttons' or visual elements that appear in order to urge the user to formulate the performance's plot.

2.4.1 Visual Elements that Contribute in the Virtual Scene's Synthesis.

For its better comprehension, the example of the virtual educational performance 'Greek Traditional Costumes'⁷⁵ is given .

Greek Costumes

AUTHOR'S EXPERIENCE

In this performance, the elements in the environment are 2D e.g. the plants, people and



Byzantine Costumes

animals. This options was selected by the creators in order to familiarize children with the aesthetics of the Byzantine era through representations of Byzantine icons. The aim of the performance is to find the hidden ornaments and to match them with the each character. For example, Theodora's earrings or the officer's buckles (symbols of palace status) are found on the donkey's saddle or in the fountain. In the performances' dream -like environment, created by musical sounds, birds songs and hunting for the hidden objects, the children learn about the history of

Byzantine costumes.

The user's choices must be distinct like correctly designed buttons e.g. the officer's buckles, which when found by the child, he is approached by the officer who points out to whom it belongs to, verifying the child's selection. Visual elements that appear as the birds flying over the donkey in order to attract the children's attention to discover another ornament. Moreover, factors must also exist that inspire the participant's interest and do not bore him. Variation always enthuses the spectator. Elements that are irrelevant to the performance's concept are the birds in the garden of Justinian's palace or the flowers and fountain that decorate the area. The participant's need to be surprised by the appearance of hidden choices, forces him to observe and search the area more carefully in order to not miss a thing. As for example, the Emperess's earring, found on the donkey's saddle, at first appears to be part of the saddle's design. Action is triggered with the time of movement and the position of the gloves or remote control.



Kids' Participation in a VPerformance

- The event's action responds to the intervention of sound, image and touch and the possibility of interchangeability must also be considered. Maybe the system must provide the possibility to adapt to the characteristics of the participant, his educational background, or the time he wishes to spend experiencing the event. Another possibility might be to adapt the level of his presence in relation with his interaction and response to the virtual area.

2.4.2 The Role of Software in the Construction of the Virtual Scene

'One must think of a spatial display as any dynamic, synthetic, systematic mapping of one space to another'. Ellis, (1988)

Mitologies

AUTHOR'S EXPERIENCE

Mitologies is a performance created by a computer that you travel through. The river, the garden and finally the labyrinth are not places, any more that a theatrical stage is, since the participant cannot step off the virtual environment without destroying the experience. It is an enormous computer driven system for recounting an immersive adventure story. This is carried out in a light manner resulting in the accumulation of knowledge if the themes of the performance are fully comprehended. It requires the participant to question his selection of paths, it places him in the process of thirsting after adventure in order to reach the end—solution that in reality is never actually attained.

The structure of a realistic virtual environment is a complicated issued due to the numerous details needed to create a realistic representation. For example, the creation of a hill has many peaks and slopes. In order to create the desired visual result, even in the case when the participant approaches to such a degree that he can note each detail, as the earth's crevices, the development of software intervenes.

At a lower elevation there are *'The Interactive trees'*, (1992). This artwork represents a



The Interactive Trees

forest. The forest as a whole can be seen from a distance, but as the participant is near, he can see every tree, and every branch. He can get close to the ground and examine the details from various angles. A painter might take days to render a single view with the desired details and naturally, this visual angle is not the only one selected by

the user. With every movement, he has a different angle. It is obvious that he needs the respective time to note all the details from each visual angle. With the abilities offered by existing software, the realistic depiction of all details is still not possible. Therefore, in an idea's conception, creators should also define the process through which the world is created. They specify also the instructions to be followed to produce a virtual environment.

'We write software that a computer executes to render the world you see and experience at the moment when you experience it'. (M. Roussos, personal communication, 10 February 2001).



Temple of Zeus

With the spectator's entrance in the virtual area of ancient Olympia, he can move in the temple of Zeus, rich in images and intricate details, *'two very high-resolution images (one for each eye's view, from a couple of inches apart) must be created every thirtieth of a second'*. Holtzman, (1998).

- **In the virtual environment and with the assistance of relevant software, the spectator can follow any available path in the virtual performance.**
- **The creator is also in the position to suggest software applications that will materialize his idea.**

2.4.3 Realistic Representation

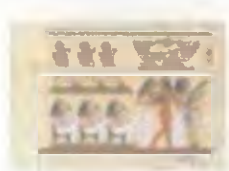
Equipment today has not been developed to a stage that can perfectly reproduce nature. Nature's representation required details in order to be photographically portrayed and to provide the virtual representation that the contemporary creator and audience demands. *'Art is presented as a creation and not solely as an imitation of nature.'* Fischer E., (1964) This could be the incentive for virtual environment creators in order for them liberated from the exact portrayal of the real world. As Marx stated, *'it is a steady withdrawal from the creation of the man-made "civilized" reality'*. (cited in Fischer, 1981, pp.XIII)

It is a power that the creator comprehends and transforms into a work of art in his own fashion. Therefore, we automatically have a differentiation between artists that interpret the exact same work. Moreover, the world is a personal visual perception that greatly differs from that of the spectators. The interest of the Human being is to produce pictures of reality.⁷⁶ A general idea exists that the virtual environment must mimic the real world. This claim however destroys artistic creation and restricts the further development of art in the virtual environment.

Computer graphic images that the user might find in films are the direct descendents according to feelings of illegitimacy and the paradoxical appearance of synthetic reality that provides the sensation of realistic representation. This hybrid –illegitimate condition is the certain future of images that are produced by the computer and are photographically realistic in contrast to photographs, they are not connected with a reason or actual occurrence or original object.

This discussion accepts the indexical character of photographic signals that composes cause and effect. The cause for example is colour and the effect is the stamp on the paper. Thus a photograph is the signal of the effect with the meaning that the sensitivity of a film captures light. Also the emulsion paste that covers it verifies the presence of actual objects or people that once were in the specific virtual environment and whose presence was captured firstly on the film's negative and then on paper.

As described in section 2, western culture has the tendency to religiously present reality by using whatever means possible for its attainment. History of art has made known mankind's perpetual attempt to portray his environment as realistically as possible. From caveman's drawings, whose design capabilities were of little interest, as well as the children in Cycladic art where abstract forms was predominant in the statuettes. The 5th century BC had to be reached in order to admire a work's descriptive similarity with reality. From the 5th century BC up to the 19th century AD we note the pragmatic depiction of reality through art and artists are judged according to their capabilities of realism. A long time passed for man to comprehend that art forms are actually a means of transmitting information.



Egyptian Symbolic Art

Cavemen had totally grasped this concept. Also the ancient Egyptians drew in order to transmit information through hieroglyphic illustrations that decorated their sacred grounds. Therefore, through this art expression, the Egyptians gave a symbolic meaning to art.

In modern art expressions, artists conceived that reality has a completely subjective significance. They were therefore liberated from accurate representation and occupied themselves with the symbolic transmission of information through their works of art.

- **The important factor in depictions is not the close representation with real-time animation for the simple reason that the spectator conceives surrounding space in a different manner.**

- The interactor's relationship with virtual objects also plays a vital role as well as the effects used to create the impression of spatial presence.

Furthermore, in the first years of experimenting with the virtual environment, the results of realistic representation were extremely poor but still excited those involved.

The general opinion that Virtual Reality is an imitation and all imitations should be authentic does not exist. What is real is each individual's subjective perception. Heraklitos 400 B.C stated that *'Ἀρμονίη ἀφανὴς φανερῆς κρείττων'*. (External reality often deceives us. However each of us has an entire inner world).

This confirms the opinion of Maria Roussos: *'it is unnecessary for an environment to have a realistic depiction'*. (Personal communication, 10 January 2001)

Realism does not allow art to develop as the artist has the need to surpass semblances. Performances are developed through visual and narrative conventions.

- In the CAVE all is an illusion i.g. space, time, light even the interactors that experience the performance through their disguises. Therefore, a prejudiced tendency to undiluted realism is inappropriate.

Mitologies

INTERVIEW RESULTS

In the design of the area in 'Mitologies' the church encountered represents the seven churches described in the Apocalypse, if confronted with a certain amount of realism. This occurs, as it is acceptable that the scene represents a 'fake world'. However, to what extent is the virtual world obliged to resemble the real world since it is condemned by its nature to live by the conventions of its illusions? The church is constructed for the needs of the performance to provide a convincing not plausible result. Thus existence is presented beyond phenomena. Creators are not interested in imitating Da Vinci's real designs. They are not interested in historical truths as the performance was created to combine in a conventional area in which diachronic elements tend to be involved. What is the purpose served to realistically depict all individual elements since the interactors, think, act and feel beyond reality?

In the area of Skin City the environment is dissimilar to a real one. Despite this fact the



The Skin City

meaning of reality is not lost.

The interactor experiences these dramatic elements as if they actually existed.

At this point, the existing crisis of the virtual environment is made obvious even behind the conformity to lesser aesthetical theories of realism. If the participant is in a virtual environment and holds a glass of water (the water doesn't exist) and tries to drink it we have the aesthetical approach that abolishes the object but not the belief in its actual existence. At this moment the participant believes that the glass is full of water.

The antinaturalistic creator can create without tangibility but retaining presence in the scene. In KALI, performance, most elements are exempted from plausibility without losing the persuasiveness of their existence.

- **Virtual presentation can be developed even further and totally escape from reality as the participant's presence operates in the virtual sphere.**

In *Ghostcatcing*⁷⁸ virtual dance collaborated the human movement presented in the absence of body drawn lines that carry the rhythm and intent of physical movement. Even with development of telepresence the point of cutting all ties with reality can be attained. However, the performance might not exist due to the interactor's involvement but due to his will to experience it. The plausibility of the performance and the urge for photographical depiction is an aesthetical pursuit that the audience expects to face with any new artistic expression. As in photography and drawing, a work is considered aesthetically complete if it contains photographical depiction.

- **The audience and artists had to mature, be liberated, experiment and express themselves in different ways that are far from realism. In time, the present art form will also mature and escape from realistic depictions that as expanded above, depends on the perceptive abilities of the individual and not on the aesthetical approach of realism.**

Montrian spoke of the possible 'disappearance' of art, if realism replaces fantasy, and subsequently the work of art. (cited in Fischer, 1981, pp.5)

The relationship between man and technology becomes smoother but the artist's role progresses with more difficulty. Artists can adopt the vision of the world's representation that is the foundation of the virtual world. It is a vision that is unavoidably fragmented and without continuation. They must take on the responsibility and design original means of expression that aim in transforming the accuracy of art into the inaccuracy of the sensation and knowledge of aesthetical enjoyment.

- **The artist must proceed beyond the known models and technology available. The knowledge gathered from existing models will never produce art.**
- **For creators, these models are powerful tools that can be used to create their own system of symbols. Rules in art must be constantly replaced by others.**

2.4.4 Design

Philippe de Reffye (1992) differentiates images into two categories: quantitative, that includes research models and qualitative that clearly includes only artistic images. It is the perception that must be expressed in relationship with the conformance to certain rules that are subject to particular mathematical models. He believes that scientific knowledge assists in the comprehension of phenomena under observation. For example, knowledge of biology is not necessary to design a plant but it is fundamental to grow a plant digitally.

Man cannot grasp the scientific developments in computer science and technology, nor that of combining art and new technology or art and science. In the means used to produce a work in virtual reality he has the capabilities to merge design aspects of traditional art methods or from the new reality –technology.

- **Technology provides creators with new tools that can be used for experimentation and to serve one only purpose, the evolution of art.**

As in a traditional design also in electronic design the artist is called to present his idea through visual depiction. The ways in which this depiction is carried out are influenced

from the elements and image structures used by traditional artists. The basic factors of synthesis are the points, lines and levels.

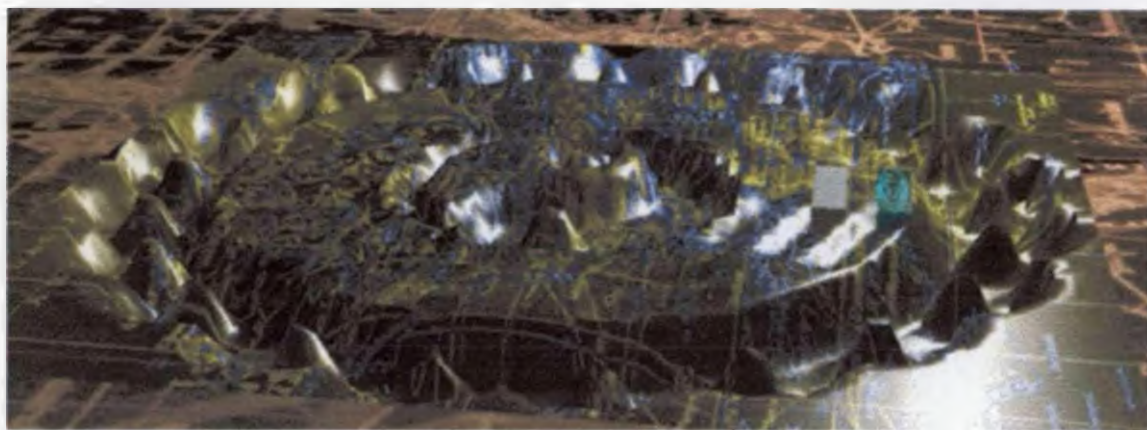
The point is the beginning and end, a two-dimensional entity, a unit of measure. The point could be the pixel in the world of computers. The traditional artist finds it for example in the canvas and the artist involved in information technology finds in his computer's screen. *'It is the final and only combination of silence and speech'* Kandinsky, (1980).

According to the philosophical approach to geometry, the line is the evidence of a point's movement. It combines its release and disengagement from static and its transition to dynamic. Linear forms are governed by the active notion of energy & have characteristic elements of movement such as intensity & the linear form's direction.

Finally, the primary level that is determined by the synthesis of the linear forms is presented firstly in drawing as a vitally important means of expression (the canvas level). It then captivated sculpture and architecture. With the emergence of computer technology in art, the 'primary levels' are composed of the 3D environment in which the spectator can enter and penetrate. With the use of the above elements, the creator is called upon to materialize his idea and begin to create his synthesis.

In KALI, performance the central point enclosed by three pentagons a circle and an eight-petal lotus. While the triangle within a female deity's *Yantra* points downward, it points upward within the male deity's *Yantra* ...

- This is done by placing objects in such a way in order for the synthesis to present a mathematical structure based on rules or to place forms in ways not based on calculations, giving the impression of a type of asymmetry.
- Every synthesis must co-ordinate all elements around the center of its interest.



Ying Yang City

As for example the way in which the central entrance of the Ying Yang city is regarded in order to get into of the virtual worlds. Ying Yang City is an original *Mandala*. *Mandala* is a Hindu term for a circle. *Mandala*'s were first brought to Tibet from India. *Mandala* is a synthesis of a traditional structure with geometric figures. Coinciding in essence with the *mandala* are such figures as the Wheel of the Universe, the Mexican "Great Calendar Stone".

There the 3D environment, that is the focus of this research to date, conforms to the above rules.

- In this area the creation of positive and negative sectors exists.

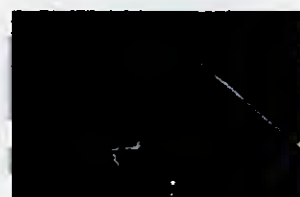
For example a negative sector would be an empty space. At this point the author cites the majority of digital works that are created by computers in which the deductive performance is common due to the insufficiencies of equipment to support numerous and complex details.

The impression of depth in the 3D environment does not bother creators that experiment in this area as it is taken for granted. As in the example of theatre, the third dimension is a matter of course and does not need to be created by the play director. However it is considered during the compilation of the play's structure in comparison to the objects that appear in the activity area.



Gateway D

Such as in Kali's D⁷⁹ gateway, in which the interactor suddenly flies in a swirl of fantastic Indian Sanskrit worlds. He moves forward and discovers that he is flying out of the cosmos to the earth through the tunnel of Kali, full of Sanskrit symbols.



Gateway D

- A sort of a symmetrical labyrinth, in which depth is confronted as a tool, assists the creator in guiding the participant through the performance.

2.4.5 Colour

'Colour in the computer is the result of digital signals that stimulate electrons from a cathode-ray tube. The electrons appear on the screen's glass surface that has phosphoric layers and thus colour appears on the screen'. Wong (1998, pp.109).

An important factor in the creation of a work of art is colour, light and shading. Light allows the distinction of objects in the area stimulates the senses as well as sending out symbols to the audience.

But how will the artist select colours that will suitably express his ideas through a aesthetically acceptable event? How will the feelings he wishes to express be transmitted to the audience?

It is clearly an intellectual undertaking that stems from the artist's soul and is directed to the audience's inner being as the spectator feels colour and sound. Aristotle,(1997)

- Colour, it seems, translates immediately into an emotional quality, which derives partly from personal associations; partly from experience in nature.

The psyche-soul, has more perceptive energy than sight. It provides the spectator with the chance to differentiate and experience the colour harmony and their meaning through various tones and combinations. The human eyes, metaphorically speaking, view colours but

the psyche perceives the spectacle in a much deeper way by deriving emotions from the proffered colours. Colours can be utilized according to the study of the Varnika Banga³² secret. It is feelings (emotional conditions) that mould the soul. These feelings stem from colours and their combinations.

KALI The Goddess of the Millenium

AUTHOR'S EXPERIENCE

The Kali sculpture plays a primary role in the performance. *'The goddess of the Millenium'* appears to the spectator as black and unapproachable. This occurs due to the semantic meaning given by the West to the black colour. On one hand it represents denial to life⁸¹ as it is connected to the lack of light and primitive darkness and on the other, it depicts the symbolical meaning of the anxiety felt due to a perpetual condition. This is the first impression until the spectator approaches her feet. Here he will feel all the metaphysical power that stems from combining the black colour and his feelings of the sculpture's shape. This is the moment that the spectator is transformed into a participant and immersed into the performance in which he is now active. He has received the aesthetical message that invites him to become activated in the performance.



The Kali's Sculpture

- * Colour as determined above, can be manipulated by the artist to transmit information to the participant.

Mitologies

AUTHOR'S EXPERIENCE

For example, the four-door room in *'Mitologies'* the choices presented in this room are the four coloured doors, a white, a red, a black, and a "pale"⁸² door. These colours represent the colours of the horses as described in the Apocalypse, indicating that the woodcut room that follows is that of the "Four Horsemen". If the participant for example, selects the pale door, it will open up to the tunnel leading to the woodcut room.



The Four Door Room

This can be designated as 'colour coding'. With the use of colour coding, the artist provides aesthetic information in other words, colour synthesises a virtual environment for the participant on the screen.

KALI The Goddess of the Milleniu

PARTICIPANT'S EXPERIENCE

In KALI's gateway C the feeling of fear and terror for the future is transmitted to the participant by experiencing a virtual environment. The petrified sea of marble (the material's colour) creates the feeling of depression, a darkening of logic *'... Suddenly I find myself in a vortex of light and images a dreamlike dimension in which the ill fated and the positive seem to coalesce into a common reality. I turn and move forward to a petrified sea of marble of opaque colors, covered with deadly weapons, fear, horror ...'*⁸³

These emotions come into conflict with the feelings derived from the opaque colours thus creating a surrealistic experience for the interactor.

On the other hand, colours can operate in order to depict a realistic environment such as that of the ancient town of Militus. This performance provides environmental information to the interactor for example, the sky in blue the marble buildings in white and brick roof in red.

- These examples indicate that the colour helps interactors to understand the environmental metaphors.
- Moreover, colour provides the artist with the ability to create infinite metaphors and also the potential for creating 'artificial realities' using combinations of colour and shapes.

It allows the creation of a virtual environment in which the participant might experience aesthetical pleasure. Besides, colour in the VE is able to influence the participant's emotional state. For this reason experiments⁸⁴ are carried out that aim in finding combinations that will bring the participant closer to the performance.

2.5 Immersion

I take "immersion" to mean "being surrounded". Bryson, (2000)

Mitologies

AUTHOR'S EXPERIENCE

The screen- based computer generated environments such as the '*horticultural maze gardens and a magnificent church*' could also provide the structure of an immersive visit. The screen is an attesting 'fourth wall' and the wand is the threshold medium that leads the participant in and out of the Mitologies experience. When the wand is closely tied to an object in the virtual environment, the participant's actual movements become actions through the virtual world. The continuous activity of the participant into the virtual environment means that even if he moves through the space, the environment is still present, it's a live action stage.

Section 2 referred to immersion. As in all art forms, likewise in virtual performances, creators experiment in order to discover more sophisticated ways in which to achieve the spectator's perfect immersion into the virtual world. In other words, they stimulate the audience's senses and surround them with the performance with, for example, specific dramatic moments that reinforce his sense of immersion such as sounds, colours, action and points of view.

Immersion refers to the cultural logic and also to the participant's experience during his experience with events that takes place in the virtual environment. Peter Lunenfeld presented this encounter to "*an immersion into an experience*" of a synthetic world.

Immersion has become a '*cultural topos*' Erkki Huhtamo supports. This opinion is verified by what occurred on '*The Tonight Show*', 30th September 1999 on the NBC channel. Jay Leno went on a journey through his computer whilst sitting in a room in front of his computer. With the technical assistance of Richard Simmons, Jay was transformed by computer equipment into a moving caricature.

There is a difference between immersive experiences that use different sensor intensity or similarity levels between actual and virtual spaces. Contemporary position for example does not use special movement effects on human bodies in theme park rides or natural

interaction between the user's body and the virtual reality⁸⁵. Despite the fact that a head-mounted display in the virtual environment allows selection between the virtual and real environment, the viewing of an event retains the sensation of reality wherever the spectator is positioned.

- **The luminous screen with scripts or objects draws –hypnotizes the user resulting in his deeper immersion into the event.**

The dark area in which the artistic event is presented, in conjunction with the luminous density of colours, relaxes the spectator and allows him to immerse more easily into the performance as his attention is drawn by the subject.⁸⁶ The creation of the dark projection room in cinema was based on this characteristic. This study is not able to go into any more depth on this subject as it composes an entire research on the science of psychology.

The sensation of immersion appears in various cultural practices and its appearance is fundamental in the phenomenon of the virtual performance. Henry Jenkins states that new technologies require cultural models of consumption. These have been noted in previous models that expressed the individuality of the specific means⁸⁷.

The phenomenon of immersion is interesting and important from the moment that art entered the life of mankind as has been indicated in section two.

- **The aim of each artist is to stimulate the creator's emotions in a manner that will achieve the spectator's total immersion and relaxation in daily activity.**

The cultural contribution to contemporary society is generally involved. It is vital to note that the factor of technology that in summary will be determined, and more specifically that the use of technology is the result of natural characteristics of technologies involved in the telelogic method, completes a fundamental nature. The essence of technology produces through cultural practices whose political and social results interact with the audience.

2.5.1 Metaphors

The essence of the word genre in the computer has been derived under the name metaphor.

The word metaphor has a completely different meaning than the one used in literature. It is a technique that develops anticipations for content and form, a technique that has many metaphors. It at once sets participants expectations and self-enforced limits of expression.

Consisted with earlier discussions on the fallacies of rationality, the models proposed by Gazzaniga, (1985) suggest that most of what man does is controlled subconsciously, so that he turns his attention to only those thoughts of which he must be consciously aware, such as survival. Thankfully, people are not aware of what the brain must do to keep their hearts beating, or their body temperature relatively constant, or even how it goes about perceiving the things around them. But the interpreter is also a window onto subconscious as well as a receiver of subconscious messages, and the models proposed by Gazzaniga, (1985) suggest that the visual perception may prove to be our most valuable metaphor in understanding how the brain functions neurologically, how images reflect the power of subconscious and how seemingly instantaneous gestalts and a persuasive sense of holistic unity function as integral parts of consciousness.

The metaphor most useful in explaining a unified sense of self as well as the impact of mental imagery on the conscious is Gazzaniga's (1985) theory of presence of the 'interpreter' which receives and interprets information from the relatively autonomous other programs within the subconscious. Functioning independently, the interpreter receives messages on what the subconscious is doing and then rationalizes this in retrospect -some times areas with ridiculous excuses- to the conscious mind. The interpreter will work until does make sense of what it receives, sometimes accepting the most improbable explanations just have.

Computational tools and applications have predisposition to behave in certain ways on functional and stylistic levels. Interfaces are designed to communicate those predispositions to user-participant, there by enabling them to understand, predict the results of, and successfully deploy the associated behavior. When the participant thinks and communicates about behavioral predispositions, he uses metaphors based on living organism.

Robots+Avatars dealing with Virtual Illusions

Ying (avatar) and alter ego of Koala. Ying represents the feminine principle. She is strongly related to the physical world through Koala. **Yang** (avatar) lives alone by itself in the limbo of the cyberspace and represents the masculine. The participant can interact with each single robot in its environment, by moving a joystick. This interaction generates a real time reaction in the behaviour of the robot as well in the avatars in the VR-world, visible on the projection screen at the top of the scenography of the arena " the real world".



The Avatar

An interface agent can be defined as a character enacted by the computer, who acts on behalf of the participant in a computer-generated virtual environment such as avatars.

Interface agents draw strength from the naturalness of the living-organism metaphors in terms of both cognitive accessibility and communication style.

- **Metaphors are a basic tool of virtual performances as mentioned above.**
- **Metaphors and participant's observation are also important tools for the development of a virtual performance.**
- **These metaphors are in the position to create aesthetics as they simultaneously depend on the artist's and participant's inner world.**

2.6 Navigation

The most intriguing challenge for a contemporary author is to narrate a story in a fluid dynamic environment and through it to create feelings of pleasure.

As the modern spectator experiences a non-linear culture of mass media, he has begun to adapt to the unfolding flow that is a characteristic element of a virtual performance. He is therefore at the initial stages to be able to transform the non-linear to linear, as he is familiar with the symbols that lead him into the virtual event. He can combine semantic elements such as knowledge, images, sounds and even symbols that lead to numerous conclusions through which he can navigate.

- The participant requires signs that will allow him to move from one simultaneous action to another and help him to keep the various actions coherent that take place in the performance.

Virtual performances are characterized by multistage narrative, such as *Mitologies*, in which the participant is called upon to wander in the Labyrinth on account of the many areas in which the performance develops. Thus the narration should progress in such a way that stimulates the spectator's curiosity and urges him to proceed from one virtual area to another.

Mitologies

AUTHOR'S EXPERIENCE

For example, the Ariadne-Beatrice-Mary room –from the *Mitologies* is the second room in



Ariadne, Beatrice, Mary Room

the sequence that presents the participant with three words to choose from. These are the names of three women with significance to the narration: Mary, the mother of Christ, Beatrice, Dante's love, and Ariadne, King Minoos' daughter who helped Theseus find his way out of the labyrinth.

It is obvious that a narration with spatial depth and sequential length allows to a great degree successful immersion. This of course presupposes clear signs during the process of navigation that will not fall short of the participant's expectations. It is like a puzzle that to be completed will have to progress into the virtual environment and be activated accordingly.

- The initiatives taken by the participant provide him with a second property, that of interactor.
- This is achieved with practices such as positioning the camera in the character's natural position, this is called the first-person viewpoint.

In *'Robots +Avatars Dealing with Virtual Illusions'* mobile robots navigate through the relationship between simulated models and real robots. The mobile robot models are linked to the real robots in the VE and act in relationship to the robot's actions. The performance is achieved with the support of robot interaction, mobile robot navigation and participants. The main effects used to achieve this immersion would be to virtually place the spectator in another environment in order to serve the event's purposes. Therefore, the interactor could become the viewpoint of Koala⁸⁸. In this way, he assumes, through his interaction, the other's position to view the worlds around the participant. Another point of view is that the participant sees the movements of Koala, Ying or Yang as if they were placed in a virtual chamber in front of his eyes. He could also have an "external view point", that is to say, externally see the inside scenes...change radically from the perspective of the personages and assume the position of the view of a bird, for example, fly over the landscape, the visions and the landscape of the virtual world.

Stage effects such as Zooms and travellings⁸⁹ are used in order to guide the interactor into the performance's plot.

- The area of computer graphics and also special effects that take place within and outside the event such as Kali's⁹⁰ external world, is the world of effects, generated by the participant who is interacting within the virtual worlds.
- Many levels of the labyrinth increasingly exploit the navigational satisfactions. All of them permit the participant to experience conditions that stem from intentional navigation. Movement in the virtual environment is quite interesting if the navigation structure has logic easily followed by the participant.
- As noted, navigation often follows the structure of a video game. The interactor is led to change areas and follow links from one space to another.
- Moreover, in digital performances, the use structure of the *'adventure maze'*⁹¹ is observed. This structure is particularly suited to the digital environment because the story is tied to the navigation space.

2.7 Interaction

Interactivity is a technological achievement. It is the spectator's ability to be transformed into a performance's participant. The creator must experiment with ways that allow the spectator-user to successfully enter the work of art without being distracted from the work itself. More specifically, interactivity must become a component of the presented work.

The processor constantly produces a synthetic sequence of images. However if the user, with regards to the camera's direction, light, sound, etc interrupts this process, an interactive illustration is presented, in other words, a new sequence of images.

- **With this capability of interaction, the artist, with the participant's input, can select to change the performance parameters.**

Every means of interaction through the computer is a form of communication. This communication depends on its application. A computer game user communicates in a different manner with that of an e-mail user. Numerous and different ways of communication have been presented through the computer. In virtual events we also note different ways of communication between the user and the work. This occurs as the nature of each work differs. For example the work *'Objects of Ritual'* (Will Bauer and Steve Gibson, 1994). The story is split in two main sections. The inactive 1st part and the interactive 2nd part. Users at the first part are only observers and take up only the physical space. During the second part of the show the users participate by controlling 3D objects as they move through the physical space. *'It is the presence of, and communication between, the participants that sustains the world'*. Moser (1995, pp.274).

'I shorten the definition to the buzz phrase "interaction with thing, not (possibly animated) pictures of things.' Bryson, (2000). *'Interactive means that the user/browser/audience has the ability to act to influence the flow of events or to modify their form.'* Wilson, (2000) The above definition provides the dimension of interactive means.

The book is the most common example that does not allow interaction as also the traditional cinema. During the reading of a book or a cinema show that use the above means, the reader or the spectator is not allowed to fast forward the film or jump a section

in the story because he will lose a part of the plot's development. The difference with interactive performances is that the choices available to the participant are left up to him and he must select from the available range. If the participant does not select a choice then he cannot be an interactor. The selection must be in the virtual place so it can be apparent to the interactor. The structure of interaction often directs the participant to select in a specific time period and also with the entry of various objects that also directs him.

Non interactive applications that present a continuous structure, as the cinema or dance, do not permit the spectator to change the flow of the event. Interactive events however avoid the linear sequence of the plot's development.

Up to now, performances followed the rules in a creation and experience of a work. Creators provide the experience and have the responsibility to create it. Namely, they provide the plot's structure, the aesthetic direction and the rhythm of the performance. On the other hand, the spectator does not have this ability.

KALI The Goddess of the Millenium	AUTHOR'S EXPERIENCE
The interactor approaches Kali ⁹² by walking up three steps, laying his face against hers, looking through her eyes interacting with the devices integrated in her neck, and navigating into KALI's virtual <i>Inner World</i> as well as generate inputs and reacting to her <i>External World</i> .	

- The success therefore in the new interactive means is for the creators to overcome the barriers between themselves and the audience. This can occur with the audience's capacity to interact not only in the action but also in the plot's development.⁹³
- This fundamental difference overturns traditional aesthetics, that is creation through a logical sequence. Interactive works still win over the points of non-interactive ones.
- Interactive performance designers must observe that in order to attain successful results in work produced in the virtual environment, they must deeply consider the user's psychology as the element of interaction allows the user to contemplate his choices. Therefore, if he cannot abandon himself to the plot, with the element of choice he will be removed from the dream or fantasy state at which he originally was before the selection.

'Scientists have proven that interaction is the single best way for human beings to increase their intelligence'. Rosen, D., (1993)

Rosen's statement was verified with a number of educational experiments and with the author's 10 year experience in education.

One of the basic questions that occupy instructors is what is the best way through which man can absorb knowledge. Results of teaching staff and psychologists is that interaction is the factor that helps man to better obtain knowledge. The first person to deal with the issue of interaction was Vannemar Bush in 1945. His position is considered to be the corner stone of the development of interaction. He compares the human brain to a huge computer and states that the human brain does not think in a linear but in a combined manner. According to stimulations received it can compare and process information. The flexibility of this collaboration is the key to the requested results.

Observational studies of children and students showed results that encourage interactive methods as a means of learning. Through research learning is easier. Each interactive structure that allows the participant to act according to his personality has much better results. The above traditional and theoretical structures, with the help of technology, surpass the levels of knowledge & training and progress into more developed interactive structures. They also pervade into areas such as entertainment or therapy. Through the performance's structure, interactors follow their own paths of thought and contribution and encounter experiences in their own personal way. They combine their inner world with the action according to their wishes. Even if interactive events differ regarding their content's objectives and applications, it is interesting for a researcher to note the design structures required to create in respect to that requested of the interactor.

- **An interactive event requests the participant to interact much more than a traditional one and to think more deeply whilst experiencing the performance.**

This occurs in the Mitologies performance in which the interactor must be constantly alert in order to combine elements of knowledge that will assist him in discovering the exit from the labyrinth.

- An important issue that must be considered by creators during the construction of a performance, is the mass of information that must be conveyed to the participant so that he can be able to interact. The selection of information and choices that the performance offers the participant, is fundamental for the participant's contribution to the plot's development.

The interactor is called upon to act as a creator and to investigate and probably piece together the plot's elements (characters, actions, sometimes charades and secrets must be discover etc). He also has the ability to select his role in the performance. For example in the Kali performance, the access to Kalis' inner world is possible by navigating and interacting with the icons, spread within Kali Yantra and with the interactive images, objects, figures within the ambiances of the categories. Red is the colour of the negative icons; blue is the colour of the positive icons.

'In the performance Robots + Avatars dealing with V Illusions the installation integrates virtual reality, robotics and telepresence with a high aesthetical content as well as a suggestive and enigmatic interaction. The Real Ambience represented by a physical structure under the form of an Arena'. Fischnaller (2000).

Robots + Avatars dealing with V Illusions

AUTHOR'S EXPERIENCE

Ten different worlds or cities that are contained in the "Mother City" Ying & Yang articulate the Virtual Ambiences. The personages in this installation exist both in real space Koala =robots and in virtual space Ying and Yang: avatars. Each can control the other and yet both are controlled by the interactor in a local space and also through the net (in a non-local space).

- The artist's aim is to communicate with his audience through a relationship derived from interactivity and the choices that stem from the audience's diverse backgrounds.


The interactive characteristic is not a new phenomenon for the creator and spectator of a virtual performance. It has been often tested in the area of video games and multimedia presentations. Events that take place in the virtual environment for the time being simply borrow these tested methods that have been developed in the past by authors and artists, with the aim of formulating their own guidelines. These are the methods that create interactivity in

a virtual performance. The characteristics of interactivity are not only specified in the events of the performance but also in the rules by which these events will take place.

These guidelines must conform to high aesthetic criteria and are processed in order to ensure their originality. Artists involved in this field still face the work as traditional artists that create for the cinema, theatre, etc., but they need a specific way to structure a coherent performance not as a number of linear sequences but as a multiform performance accessible to the collaborative participation of the interactor. This does not determine that the interactor should have unlimited independence. Such independence would endanger the control of the performance's plot. Naturally, all is changeable and rather uncertain, besides this being a characteristic of the mean.

2.7.1 Movement

'Motion is omnipresent in perception, Stabilize an image on the retina and it rapidly becomes imperceptible' Pritchard, (1961).

Robots + Avatars dealing with V. Illusions	AUTHOR'S EXPERIENCE
 Interaction System	The visitor has the capacity to intervene, interact, penetrate within new worlds, change the actions and movements of Koala and the avatars... command koala to move towards its avatar or Yang, enter into one of the cities, wander around the "Mother City".


KALI The Goddess of the Millenium	INTERVIEW RESULTS
The <i>Kali Yantra</i> has four gateways, one for each category. Colliding on it, the interactor navigates through an exiting tunnel to the different ambiances of the categories. In category A, the interactor flies up inside the tunnel, related to the Man Destroy Nature concept. He is surrounded by flying objects coming from all directions, everything becomes like a vortex with flashing lights. The tunnel brings him to a dimension of death and destruction. The interactor finds headlines of newspapers with the news of war, destruction of man destroying man, man destroying nature, etc. Images that appear in front of him are like a virtual screen. The interactor navigates within this jungle of horror. And then he decides to look for the positive icons: the third eye of Kali. He slips into it to find a solution to the horror! And then, he moves into a wonderland, which he can perfectionate and transform, as he wishes! An interactive experience which resembles a surrealistic vision. A space, which contains illusions, dreams, desires and freedom, based on movement.	

Motion is the strongest visual appeal to attention. Motion implies a chance in the conditions of the environment, and change may require reaction, it may mean the approach of danger, the appearance of a familiar person or a desirable situation. And since the sense of vision has developed as a tool of survival, it is keyed to its task.

Movement-animation, whilst experiencing a work, is a tool that provides the participant with the ability to interact in a realistic manner. It liberates the interactor and the artist and provides him with new experiences. It is a projection of consecutive images in a specific time that is based on eye inertia (the human eye's inability to see less than 24 images per second).

Happenings are closely connected with motion because they always include activity. A virtual performance is also experienced as a happening that takes place in a virtual space, characterized by the element of action and as an event in which the physical setting provides a framework.

- The visual experience of movement can be due to three factors:
 1. Physical movement.
 2. Visual movement.
 3. Perceptual movement.

Robots + Avatars dealing with Virtual Illusions	AUTHOR'S EXPERIENCE
	Into Lautriv city, the virtual evidence of this legendary creature lies in the form of a giant crater. This rocky terrain is renowned for its virtual snakes.

If the participant observes the virtual snake in motion he realizes that the movement is actually crawling; this is motion perception based on physical movement. But as the examples show, physical movement does not necessarily correspond to what happens in the eyes or in perception. Visual motion could be discussed, as projections of objects or of visual fields are displayed on the retina. Such optical displacement occurs when the observer's eyes do not follow the movements of the perceived objects. But physical motion may be recorded as optical standstill e.g. when the eyes of the participant are locked on

the virtual snake which crawls across the road or when see the cabin of the car surround him in perfect stillness even through both the car and he, are moving. On the other hand, the projection of his immobile workroom sweeps across the retinas optically as soon as he move his eyes or his head or gets up from his chair. If someone could observe what goes on in a participant's eyes, while he examines the various parts of painting on the wall, he could find that each time the participant changes the fixation of his glance, the entire picture moves on the retinas in the opposite direction. And yet, most of the time such faulty visual information is not reflected in perceptual experience.

The participant sees the virtual serpent crawl although the participant's eyes are located onto it, and the painting remains unmoved even through his eyes scan it.

The most powerful factor compensating for such misleading inputs is kinesthetic perception. *"Any movement by eyes, head, or body is reported to the sensory motor center of the brain and in fact mere impulse to move is a brain event. The feedback from these motor processed influences visual perception"* Arneheim, (1974, pp.379).

- **The information that the participant moving his head induces the sense of sight to attribute the motion to the head visually as well and to perceive the environment as immobile.**

In a video sequence however, the setting photographed by the travelling camera is seen as moving across the screen, mostly because the participant receives the kinesthetic information that his body is at rest. Only in extreme cases, e.g. when enough of the entire environment is seen as moving, the visual input overrules the kinesthetic.

Robots + Avatars dealing with V Illusions

AUTHOR'S EXPERIENCE

On some occasions it could be observed that Koala moves in a very particular way, in his habitat as if trying to avoid some obstacles, as if he is entering into a cave, trying to escape an object of obstruction.

The screen image met in virtual performances, as a whole presents a complex interplay of moving spaces, settings and objects, whose motion come across only as integrated elements of the whole.

The virtual environment can be added to the group of arts that deal with multimedia. More specifically, the work combines sound, image, touch and scent. Movement is provided with the assistance of animation that offers mobility to otherwise immobile objects.

- **Space refers to the path of movement, which may be straight and direct or flexible and indirect.**

The virtual performance tempts the audience to proceed from one area to another. Thus the participant experiences different conditions and constantly changes emotional states. It is therefore obvious that movement in 3D-computer animation, as mentioned above, is a basic tool to be considered by the VE's creator.

Robots + Avatars Dealing with Virtual Illusion

AUTHOR'S EXPERIENCE

For example, in the Boch Hell city, the emotion of pleasure is defined with a walk through this virtual Garden of Delights. Arising from this beautiful painting are valleys and hills sculpted from the revellers of the garden. Awe-inspiring clouds float above the world in dream like forms of flying revellers. At the centre lies a magic mushroom. A painting ahead of its own time now breaks ground once more with a virtual presence. The interactor progresses through a constantly evolving emotional performance. He passes into Lautriv city's the virtual evidence of this legendary creature lies in the form of a giant crater. This rocky terrain is renowned for its virtual snakes. Big Foot is a barren land that provides the hard reality of the Ying Yang universe. He is playwright of the performance's flow.

- **The attempt to urge the spectator to move in a virtual area and to provide his own dimension to movement, is what creates aesthetics.**

2.7.2 Juxtaposition Effect

A common element of all three performances⁹⁴ is the use of the juxtaposition effect that is purposely open to numerous notional interpretations derived from different points of view. This signifies that the interactor comprehends the performance in his own way depending on his choices, an event that occurs when experiencing all art forms. That's why the journey in the virtual environment can be a unique one, similar to the journey in other art forms. Each interactor experiences his own feelings and possibly the emotions of the artist

that created that environment. Thus two parallel lonely journeys are presented that might or not meet up at some point.

The spectator through his observation –involvement extracts from each work elements of his own self. The event intrigues him and he deceives himself by forgetting, if only for a while, the surrounding chaos.

Spectators cease to be passive and are transformed into dynamic parts of the event. In order to experience the virtual performance they are required to act with the work and to help evolve the plot. This presupposes the audiences' training regarding the use of the systems and dealing with the structure of such events.

- **The artist requests the audience to dream and materialize those dreams through the events that he experiences.**

Edmont Couchot, (1992) supports *'that artists should be interested in their audiences'* involvement in the performance. In such a performance, the spectator takes on role that has certain limits. This role establishes him as an interactor as he dynamically takes place in the performance and which he formulates accordingly.

- **In other words he plays the role of the creator with the elements offered by him.**

3. AUDIENCE

'Computers and modems...have opened up new opportunities for communication between people normally seperated by distance and social norms'. Michel, (1992)

The advanced ways in which computers process information allow the dynamic involvement of the audience in virtual events. Cyberspace also allows the spectator to take part in such events regardless of where he is at the time. Therefore, information and messages are transmitted through an art bombarded daily life. In this way, new means of communication concerns both users and creators.

'From a heart to a heart', Beethoven, (1998) stated in respect to his important composition, Missa Solemnis. With this statement, he wished to claim that a work must be created for

man–the audience. Furthermore, the love relationship between the creator and the audience composes a two-way relationship.

Each work is addressed to each spectator, according to the creator's personality that is identified with that of the audience's. It is not a necessary element that the audience is trained, it can be totally insensitive, The audience might by-pass the work or touch it⁴⁷

- **If the audience is interested, it is possible to get the minimum technical knowledge needed to take part in a virtual performance.**

A number of art works have hidden meanings –ideas and whoever can discover them is able to identify with the artist and encounter profitable experiences such as feelings and knowledge. Brecht wrote that *'We cultivate a view of a dynamic spectator'*. Garonti, (1981) Moreover, feelings are generated from an authentic work of art that cause the spectator to past experiences that have been forgotten.

The spectator accepts a work of art only if he can encounter the creator-artist's relaxation during its creation.

Each spectator, after he has relaxed, can become totally immersed in the performance and experience feelings of fear, amazement, etc. In the research conducted via interviews, on this subject, the following results created the subsequent conclusion:

For example, 70% of those who entered the performance of ancient Militus, experienced emotions of awe and peace, allowing them to immediately become immersed into the graphic representations. This also was the result that the performance's creators presented. The virtual journey, allowed them to escape reality and to enjoy a trip into time. The main feeling was a sense of peace and at times also of dizziness, especially when they abruptly reached a height in the performance. Another feeling experienced what a curiosity to investigate the ancient city. The remaining 30%, managed to relax only at the end of the performance, and experienced a sensation of discomfort that was heightened as the speed of the tour became faster.

The research was repeated in the performance of Ancient Olympia (2001) and also verified the above findings.

- **The spectator can enjoy art only if he can relax and accept those elements that match his temperament.**

Spengler stated that *'forward and delayed people exist'*. (cited in Furtwangler, 1998). But forward and delayed are not only spectators but also creators.

At this point, three types of people can be depicted that experience art in their own personal manner. First there is the type that knows and analyzes. He does not only know all that he has acquired but he is knowledgeable from birth. It is the type of audience that has a close relationship with intellect.

The second type is the character that approaches art without demands and preconceptions. He only wishes to assist art in its development.

Finally the third type observes art without guilt and only with his senses or by chance.

- **Each work of art creates different feelings for spectators. Each moment is different and the needs the specific work might cover also differ.**

Works of art exist that follow consistent study or continuous trends for improvement, tend to lack spontaneity.

Improvisation is the cell that develops and finally creates the work of art or even a new means of expression. Through improvisation, the artist projects his personal elements.

- **It is a fact that the artist trains in a way his audience, but also the artist himself is developed through this. He also influences the public aesthetics of the art that he serves.**

The participant in the virtual scene feels more comfortable than the traditional spectator that views the performance over other people's heads. Firstly he is in a state of alertness. He

is not sitting comfortably and dozing off at regular intervals. In traditional performances, there is a gap between the scene and the spectator. In the virtual environment all is much closer and the consciousness of another person or area creates in the participant a more dynamic feeling of communication. This dynamic feeling is what successfully immerses him into the virtual environment.

Every area stipulates its own regulations. In traditional performances the stage is higher or lower than the spectator. Now the spectator is on the stage and a part of the action and thus attains the properties of a participant, interactor and actor all at the same time. In this way, the performance is experienced in a more substantial manner. *‘What matters is not the theoretical space, but the actual space’* Brook, (1999, pp.237)

In reality, the artist’s aim is to free the participant’s mind and to introduce him to the fantasy world offered by the virtual performance. It is therefore logical to place great emphasis on the construction of the virtual space.

Robots + Avatars Dealing with Virtual Illusion	AUTHOR’S EXPERIENCE
<p>In the performance <i>Robots + Avatars Dealing with Virtual Illusion</i>, the city Ying Yang⁹⁶ is the centre of the virtual performance environment. It is the ‘Mother World’, the all encompassing gate to the other cities. Travelling across the Ying Yang’s landscape reveals temples of illusion, each one unique, primary in shape and revolutionary in content, each one allowing the interactor to glance into the secrets of the Ying Yang. This mystic atmosphere conveys and immerses the interactor into the Virtual Illusion.</p>	

In this case it is necessary to abandon the idea of creating a conventional area as the fantasy world creates a close relationship between the interactor and the virtual environment, an attempt unattainable with a realistically constructed world. The invitation offered to the audience to abandon their habits and conventions is the factor that challenges them to experience different conditions. The way in which the performance guides the interactor through the Ying Yang is dependent on his concentration on certain points.

- These points are either visual or sound effects that help the interactor in handling the plot. The reappearance of various objects in the few selected temples are the gateways from the Ying Yang city into the other worlds.

The objectives of systems are often different to those of interactors. More specifically, what is the experience of the interactor and what consequences evolve from that? For example, an information system of Athenian sites does not have any user demands nor requires specific knowledge in order to obtain the necessary information from the computer. On the other hand, a music system demands that the user is a musician or has musical education in order to exploit the systems' potential. In the same manner, art and especially interactive event are designed for spectators-users that have the capabilities to interact with the system.

- Therefore, the creator must consider different contingencies if the audience is trained or untrained to conduct this interaction.

3.1 Communication Between Artists and Audience

An artwork always operated via the law of a transmitter (sending a message) and receiver (audience receiving a message). The message is integrated in the creator's idea. The same occurs in a VE's performance. An example is Jeffrey Shaw's *The Virtual Museum*, (1991). In this performance, the artist wishes to transmit the message that virtual museums are more than a superficial approach to traditional museums.



The Virtual Museum

'The artwork makes clear the paradoxes which arise from the transition between real and virtual space, and confronts them before they disintegrate' (cited in Schwarz, 1997, pp.150). In the Mitologies performance, the message stems from the idea of knowledge and its attainment. In the *Traces*, performance, by Simon Penny, the idea is a long standing concern over the disembodied quality of VR experience, which stands in a stark contrast to the rhetoric around VR, which argues that experience allows the user to interact in a bodily way with digital worlds. From the above examples, it is obvious that ideas are many, differing in their content and nature. The artist's aim, since the Stone Age, is to make his contribution to the spectator's spirituality. Therefore, it is necessary for ideas to emerge from the creator's restless, inner world. For example, the creators of the KALI performance are concerned on this century's ecological problem.

'It is not the great rebel but the artist with an inner peace. The rebel is a misunderstanding. By being simply a rebel one can never be great'. Beethoven, (1998)

For example in the KALI⁹⁷ performance, is an interactive passage between the real and the imaginary, orient and occident, cosmos and earth, nature and city cause and effect. A compendium of forms and content of mythical elements and ancestral memories integrated into the digital era. In the external world of Kali the visitor is able to generate situations (causes within the VR worlds) of which, it is possible to see the corresponding consequences (effects) in real time, in Kali' s External world. Depending upon the input and the output of the Virtual World, on the external screens will be projected the effects of his actions.

These actions are stipulated by written rules by which the plot is led. However the actual scenario can be modified by the participant's interaction by which the plot appears as well as writing the scenario by the participant.

- The procedure of creating the plot is progressive and depends on the participant's mood and actions. It is a story that offers the participant many choices in his movements throughout the performance. The more alternative actions he is offered, the happier he feels to express himself through the selections he can choose from.⁹⁸

The participant's actions are influenced by the nature of the visual and acoustic output from the system. Kali's worlds with all its categories contained in Kali's inner world compose the Virtual World. The world of the causes, the decision making available to navigate and interact by looking through the eyes of Kali's external world is the effect. The participant who is interacting within the virtual worlds generates the effects. The participant is the procedural author that creates the KALI performance from the given narrative possibilities.

Up to this point the issue is comprehensible. Aesthetics is the result of culture. In the specific area, both artists and the audience are untrained due to fact that this form of art is still in its embryonic phase and will take years to fully develop. It slowly develops in a similar way to a language. All cannot suddenly change. This would create confusion and lack of communication. The same occurs with art that is also a means of communication. Furthermore, interactive events differ from other art forms with regards to their objective and can prompt and deeply influence the crowds in right or wrong directions.

3.2 Point of View

'The point of view is inside the scene and the scene is around us'. Duguet, (1992)

Mitologies

PARTICIPANT'S EXPERIENCE

The room is set in the form of an ancient cross. I could enter in the room through the base of the cross and encounters a model of a person sitting at a desk with a book laid out to the woodcut of Durer's "The Torture of St. John". The model is St. John's head turned down in sadness, and arm reaching out toward me in a gesture of pleading for help. Navigating past St. John, I encounter an intersection that leads to three different subrooms. My view to the right is the room that leads to a recreation of St. John's torture. In this room I could view from different perspectives (point of views) the activity of the woodcut. The next subroom creates a scene closer to home for many in America. It is the scene of a Ku Klux Klan hanging, where the background depicts a burning cross. The clansmen have just hung a person. When I enter the room, the model of the hung person falls and the environment changes colours to from a bright sunny day to a dark and stormy night, reminiscent of the day Christ was crucified. Looking around, I could see the room's floor or walls depending on how I moved my head or body.

Objects that appear in the environment in which he interacts with that can be seen by simply turning his head surround the participant. In the virtual environment, the point of view is a characteristic that the participant can modify as he wanders inside with his gaze. The audience can present opinions that compose 'digital stories', these opinions are based on data produced by the author (writing and programming).

- **The viewpoint into the virtual scene is controlled by the user not the medium.**

That means, that when the interactor is in the virtual environment he can change his relationship to the space at his will. At the same time, the virtual scene is interactive, meaning that the user can alter the conditions he discovers within certain limits. The interactive, participant-controller dimension to virtual space takes it beyond the traditional picture space, even if it inevitably retains the three-dimensional space of traditional geometry.

3.2.1 How Artist Manipulate Physical Body in the Virtual Space.

'Far from being left behind, when we enter cyberspace, our bodies are no less actively involved in the construction of real life'. Hayles, (1996, pp.1)

In reports on the new electronic media, a worry expressed that they will elide the distinction between reality (natural and unmediated) and culture (artificial, always mediated). As Batchen, (1997) has recently suggested, the unfolding of modernity has reached a point where it now becomes apparent that there is no meaningful difference between nature and culture. In this catalysis of boundaries is more apparent than in the transformation of the modern body. Once considered the clear frontier between internal subjective experience and external objective reality, the body now appears to be a fluid and hybrid borderland between the two, as subject to change as any other culture artifact. In this sense, *'virtual reality is an awareness that the reality produced by the disciplinary society of modernity was always surreal and there are no norms against which people can reliably be measured'* (Mirzoeff, 2000, pp.116).

The aesthetics of Baroque, as referred to in section 3, are apparent in the last decade. The philosopher Gilles Deleuze, (1993, pp.35) has suggested that the fold, according to his opinion on baroque, is particularly characteristic of such effects, a fold that *'moves between the inside and the outside. Because it is a virtuality that never stops dividing itself'*. This divide between the inside and the outside of the body that seems so natural has now become a fold leading to virtuality rather than reality.

For centuries the public has often sought to see into artists' minds, now its is possible to look into their bodies and find only absences. The performance artist Stelarc⁹⁹, who has suspended himself above the ground using cables attached through his skin, and who has created cyborg performances with a third 'arm' called *Handswriting* (1982) and *Elapsed Horizon / enchanced Assumption* (1990), holds that *'The Body is Obsolete'*.

It is no longer meaningful to see the body as a site for the psyche or the social but rather as a structure to be monitored and modified'. Dery, (1996, pp.160). Even the natural body becomes virtual.

For recent criticism, the virtual body has become the starting point for new investigations of gender, sexuality and identity. Donna Haraway (1991, pp.154) has argued that all bodies are becoming cyborgs, losing the earlier sense that the human was essentially different from animals on the one hand and machines on the other. There is a danger and opportunity here.

- **The change in the approach of the human body's role, is an important aesthetic matter which is not overlooked by the creators of virtual performances.**

Artists were working on the participants' bodies as objects, manipulating them as they would a piece of a moving sculpture, other developed more structured performances which explored the body as an element space.

Objects of ritual created by Will Bauer and Steve Gibson 1994

In the second part of the performance participants begin to control and create within the virtual space. By the end of the piece, participants are given total control over the virtual space, which is overlaid into the seven-meter square of physical space via image projections on four screens surrounding the space and sounds coming from spatially distributed speakers. Participants are able to observe and manipulate virtual objects in 3D as they move through the physical space.

The participant by interacting round the virtual space, he could experience at first hand the volume and the dimension of his sculptural work (in his surrounding virtual space) which also dealt with volume and the placement of objects in the virtual space.

The above procedures contained the same theoretical premises as stone sculpture in space, but the additional elements of time and movement altered the participant's understanding of those premises: they could actually understand the process of making sculpture.

- **The above actions seem to change the participant's perception of his own physical reality. A matter that is responsible for the production of aesthetics.**

The artists were concerned with increasing the participant's awareness of spatial relationship within virtual space and real time. 'In objects of ritual' performance, the participant would

through a series of procedures, become the recipient of action. He is responsible in structuring the virtual area with which he interacts. It is a typical collaborative performance, in which participants are able to manipulate the virtual objects and change the structure of the virtual area with their interventions.

- **Virtual performances provided a means for the participants to experience the sculptural object themselves, as well as to initiate the unfolding design.**

KALI The Goddess of the Millenium

PARTICIPANT'S EXPERIENCE

I navigate toward a light blue transparent gateway, ... and suddenly I see myself flying in a sort of a labyrinth; whirlwind of Sanskrit symbols that recalls the sound of the universe, the sounds of wisdom. I move forward and discover that they are flying out of the cosmos to the earth from the tunnel of Kali. A magical path which conduct me to the positive, the negative.

- **Virtual performances offer a further dimension to the participant's notion of the body in space. Some performances were designed to disorient the participant's sense of gravitational balance.**

4. CONCLUSIONS

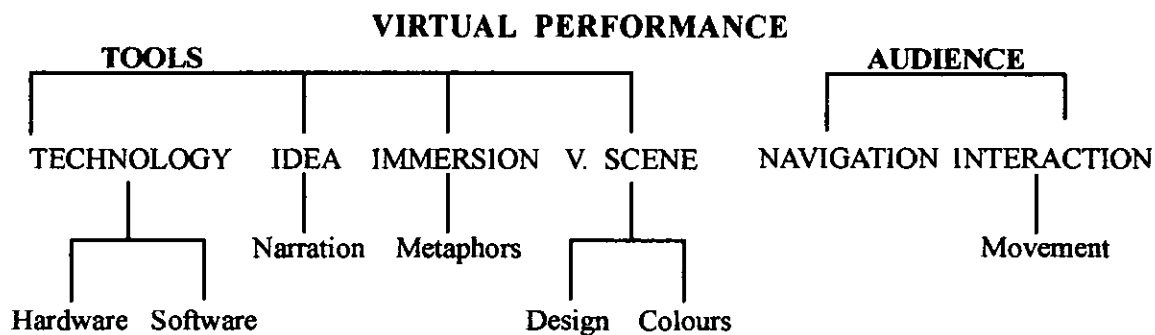
In this section, the close relationship surfaced between art and technology and also between the creators and their audience. Specific limits cannot be placed as these four components are closely combined.

More specifically, technologies depend on a discussion level and the significance of technology has been widely formulated on such discussions.

In the virtual environment, immersion takes place through interaction and with the non-sequential flow of events and display components. The users' experience in the virtual performance and his access to a countless amount of information in the Internet, presents the possibility for a more democratic participation.

On the other hand, interaction collaborates with practices that are characterized by disguised forms of imposition and freedom of choices that can guide the participant ideologically and politically, thus producing high aesthetical results.

4.1 Aesthetical Dimension of Virtual Performances Implementation



Elements that must be considered by the artist when creating a VE performances, in order to produce aesthetics.

1. Participation, without the participation of the audience, a virtual performance cannot take place.
2. Options, the participant must have the ability to move through the performance's various choices and be invited to search for possible and alternative solutions that will lead him to unfold the plot and experience the event.
3. Authoring, the participant must have the ability to add alternative solutions to the performance.
4. Timing, the performance must allow the participant to handle time as he wishes.
5. Action, the role of action is often important. More specifically, real action is not always the correct solution as the personal element also plays a vital role.
6. Navigation, the distinctness of the available choices affects the participant's selection as well as the event's development.
7. Immersion, if the above components are used, the sensation of immersion into the performance is achieved to a significant degree. Ultimately, this is the artists' aim in order to accomplish the audience's participative action.

GUIDELINES FOR V. PERFORMANCES INTERFACE DESIGN		
ENVIRONMENT DESIGN	ENVIRONMENT DESIGN	RESPONSE ANALYSIS & HELP
Do not crowd backgrounds	Always let the participant set the pace	State clearly directions and questions so that errors are unlikely
Use attentional devices sparingly	Allow participant to control sequencing	Use pointing rather than typed input whenever possible
Use elements to organize the given information	Use links as much as possible	Always acknowledge participant input
Use different object type sizes and styles for emphasis and variety	Let the participant customize the performance	Always provide corrective feedback for errors or wrong answers
Use graphics wherever possible	Provide multiple (redundant) control options	Feedback should be brief and neutral in tone
Use titles and headings wherever is necessary	Different types of helps might be necessary for different users	
	Allow participant to change his answers	
PARTICIPANT'S V. INTERFACE DESIGN GUIDELINES		
Use concrete metaphors and make them plain. Use audio and visual effects that support the metaphor.	Direct manipulation: participants should feel they are in charge of the virtual environment's activities	Participants should select actions from alternatives presented on the environment rather than relying on memorization.
What the participant see is what he gets. There should be no abstract commands that only promise future results	The participant, not the computer, initiates, and controls all actions.	Keep the participant informed and provide immediate feedback.
Perceived stability: The virtual environment remains understandable and familiar rather than changing randomly.	Aesthetic integrity: visually confusing or unattractive displays detract for effectiveness. Different "things" look different on the virtual environment. Participants should be able to control superficial appearance of their virtual environment.	Use sound sparingly, make it use redundant with visual cues, make it natural and unobtrusive; use highly different sounds to indicate different states
Modeling: A given action on the participant's part should always have the same result, irrespective of past activities.	Participant's actions are generally reversible - let them know about any that aren't	Applications are consistent within themselves and with one another.
Event loop: The participant should be able to do anything at any time.	Reversible actions: Always provide a way out.	Effective design must communicate. It must inform, not just impress.

Virtual performances maintain characteristics of the conceptual theatre. Elements such as time and space play an important role in the formation of an idea. They are also able to formulate the scenario. The idea is developed into a scenario that evolves with the audience's interaction with the performance.

The scenario must be developed into narration with characteristics that create for the spectator's immersion conditions:

- **Dramatic climaxes and anti-climaxes**
- **The audience's ability to select paths**
- **Kinds of tasks an agent might perform, which are divided into four categories**
 1. Information
 2. Work
 3. Learning
 4. Entertainment

The conditions that allow the user to play/against or participate in the surrounding performance or to create and experience aesthetics, are produced by himself in collaboration with the artist.

Elements that synthesize a virtual scene are objects such as images, sounds and special effects. The design (synthesis) and the colour also transmit information to the audience with traditional forms of symbolism.

Realistic representation is not the only way in which an idea or environment can be depicted. Moreover, realism is an entirely subjective matter, depending on numerous endogenous or exogenous factors. Therefore, the virtual performance has the ability to escape from realistic representation and to operate in other spheres, such as the subconscious.

The audience's participation in the performance, creates aesthetic experiences that are unknown to the audience as the interactive event requests the participant to interact more than a traditional performance and to think more deeply while experiencing the virtual performance.

C O N T E N T S

SECTION FIVE

Conclusions and Recomentations 154

The Manifesto of Virtual Performances Art 155

SECTION FIVE

CONCLUSIONS AND RECOMMENDATIONS

Technology provided the basis on which this new form of art was created and also formulates a closer relationship between the viewer and a work of art. It achieves an illusion that the spectator takes part in the activity allowing him to interact with an imaginary, virtual world around him.

It is true that the new art form has been warmly embraced by the entertainment industry. Should one assume that it is a fashion that will complete its lifecycle and disappear?

Finally the attraction towards the novel played an important role. A new way of operation appeared with unforeseeable technical capabilities that the TV, cinema or video could not cover. The fascination to understand and tame this technology and electronic means, opens up new paths and presents new forms of expression that do not follow current regulations. We live in the age of globalization and as Gerfried Stocker¹⁰⁰, cited in *Ars Electronica*, (1999) characteristically states “mediamorphosis”.¹⁰¹ It cannot therefore be simply a passing fashion –it is a new way of life that is based on technology. Technology is the means that allows us to create the contingencies on which this new art form has developed. It belongs to the media arts family.

This art form could be called virtual performance according to Stocker (2000) and could be named a ‘*media techno performance*’. This characterisation is more closely orientated to the nature of art according to the author. It is an art form that operates the means provided by technology to produce modern and original creations. It’s a junction between the expression of the past and future that gives the birth to a brand new and original form of expression that is closer to today and the future society needs. It is an art form that in cyberspace can be simultaneously viewed by the largest amount of people in comparison to the past, due to Internet applications. This occurs because most daily operations will soon be carried out in cyberspace.

Virtual reality is the idea, cyberspace the medium and man’s creativity the art expression that appears in this new form called virtual performance art. It has its own rules and

language. It borrows symbols and conventions from its forebearers in order to not forget its origins.

Ultimately, all ideas throughout time are more or less the same. These ideas adapt to each era according to the socio-economical contingencies that domineer the time of art works' birth.

THE MANIFESTO OF VIRTUAL PERFORMANCE ART

The artist and participant can identify that a virtual performance demands that they constantly pay attention to numerous elements. The artist is responsible to provide all the visual capabilities and the participant is required to take advantage of this potential in order to enjoy the performance.

They are both required to be true to themselves and have faith in what they achieve, without forgetting that the 'truth' might also lie somewhere else. Furthermore, they must also realise that they are able themselves or take on another role (endogenous and exogenous factors). This role exchange is realised with the dialogue created in the artwork and composes the basis of 3D visual material, offered by a virtual performance. More specifically, it is an experience, made available with technological inputs.

With the use of interrupted flow, a virtual performance is able to present a multi-dimensional world whereas the cinema can only present a single scene. Moreover, a virtual performance creates the impression of a 3D effect whereas traditional theatre offers an immobile spectacle that cannot overcome the laws of nature.

The power and intensity of virtual performances is gained from its dedication to the birth of an 3D world that has broken free of all manner of conventions. This is the world of the virtual environment, an alliance between the cinema and theatre.

The environment and its components, surround the spectator who simultaneously plays the role of actor and composer.

Movement and optics are not faced in the same way as in traditional performances, which are created in physical spaces.

In each performance, energy is formed by the actor and participating audience. Space can take on a variety of forms (natural or illusionary) depending on the performance's requirements. Projection takes place in a dark area that cause colours to take on a life of their own.

Therefore, the concept of virtual performance art is formulated as follows:

1. All art forms are combined in creating a virtual performance
2. The artist and his creation are directly dependant on digital technology
3. The audience's active participation is necessary for the virtual performance.
4. The artist and audience have total freedom to express themselves through the artwork.
5. The artist provides the spectator with the theme and the spectator then develops it according to his wishes at that moment..
6. The spectator is transformed into an actor –he takes on a role in the performance
7. The spectator must be offered a number of possibilities to participate in the performance
8. The performance must offer the spectator visual or acoustic assistance in moving through the virtual environment and developing its plot (he automatically participates its creation).
9. The artist must produce immersion conditions that will captivate the spectator and cause him to instinctively participate in the performance's development

The dialogue between the spectator and artist and their combined efforts in creating the performance, is the element that produces aesthetics in the digital environment, in conjunction with all traditional opinions of the aesthetics of fine arts.

The attempt to determine the concept and direction of a virtual performance proved unsuccessful as this art form has only emerged 10 years ago and is still under development.

One thing is certain however. The art of the virtual performance has entered the life to today's society and will definitely make an impact on areas such as psychology, science and education.

At present, access to a virtual performance is not easy. The spectator must visit one of the few international centres that has the ability to project such performances. In the near future, the Internet will be able to transmit this art form which has already achieved with the virtual performance *Robots + Avatars dealing with Virtual Reality*. A number of spectators have

already been able to experience this performance over the net. Therefore, the transmission of this art form, will take on important dimensions, maybe proving a bigger success than the art of the cinema, as the spectator will be able to experience such a performance from his home.

History proves that man has often used technology, science and art for destructive purposes. Its wrong use can be dangerous. The artist attempts to offer the spectator a sensation of free movement in the virtual environment and to have an unforgettable experience. Technology constantly assists this endeavour. What will occur, if technology or the art itself, offers negative messages via the virtual performance?

Many justified fears exist on the dominance of the art of virtual performances on man. Every popular art form can project destructive messages on the audience. The virtual performance however, has a greater impact, as technological developments can create realistic conditions that confuse the spectator to such a degree that he is unable to differentiate between his virtual and physical presence. The consequences are still unknown. These concerns have already been expressed in the cinema with movies such as *EXISTENZ* and *TOTAL RECALL*. Could their creators be considered as prophets of tomorrow's world? Some say yes, others, more optimistically disagree.

The optimistic version argues that the characteristic of interactivity trains the audience to be able to consider and decide on which messages will be beneficial or detrimental. The virtual performance, based on interaction, can transform the traditionally inactive and powerless spectator into an active and purposeful member of tomorrow's society.

Moreover, society has the tools to protect man from himself or others. As long as this occurs, the audience will enjoy the experience offered by a virtual performance and will stimulate their senses according to their wishes.

The spectator's aesthetic experience in participating in the performance, is an important aesthetic event, a fact that highlights the media art and the art of virtual performances.

Besides, knowledge and action can create aesthetics which are fundamental elements in the creation and experience of a virtual performance.

Obviously, answers cannot be provided for all the questions raised as the subject is too broad for a single dissertation and art is still in its development.

However, it instigates a new investigation during the development of the VEs art.

It would also be interesting to approach the subject-matter via the science of psychology, in which the human element is of paramount importance, in order to observe the identification of the spectator with the actor. In this way, the creators can take advantage of the knowledge offered and thus produce more aesthetical results through their collaboration with the audience.

Another question raised during the study of the research results is to what degree the spectator can be used as a tool by the creator of a virtual performance.

As long as man is a being of free will, the imponderable factors that cannot be predicted will always exist. Therefore, as long as he continues to manage himself according to his judgement, he cannot be characterised as a tool because a tool follows and carries out the orders given in accordance to the user's choice.

F O O T N O T E S

- 1 **Digital artists:** Paul Kaiser and Shelley Eshkar, **Dancer/choreographer:** Bill T. Jones. **Motion Capture experts:** Michael Girard and Susan Amkraut
- 2 G. Samartzis 'The Royal Palace of Neapolis' Oil, Koutlides collection
- 3 Vernon Merritt 'The Best of Life', Brepols, Fabrieken N.V.
- 4 FT. Marinetti, Italian poet, formulated the manifesto of the Futurist Cinema.
- 5 Scott S. Fisher is a media artist, producer, and director whose work focuses primarily on stereoscopic imaging, immersive "first-person" display environments, and 3D books. Currently he is managing director of Telepresence Research, Inc., a production company focusing on the art and design of virtual environment and remote presence experiences.
- 6 Computerised agents that simulate biological life forms have artificial life. Such agents reproduce, evolve and carry out the dynamic process of organic life.
- 7 The famous programmer.
- 8 L. Maholy-Nagy, an artist belonging to the Bauhaus movement.
- 9 Nam June Paik, the father of video art.
- 10 Virtual Voyages, Science museum, London.
- 11 V. Bush's contribution to the development of the computer travels from the invention of the Differential Analyser (1930), one of the first automatic electronic computers.
- 12 Douglas Engelbert, invented mouse, windows, e-mail and word processor.
- 13 Telepresence is the projection of the self into a virtual reality world, for example allows surgeons to combine robotics tools with cameras inserted in the patient's body.
- 14 Ted Nelson,
- 15 Cybernetic Serendipity, exhibition opened in 1968 in the Institute of Contemporary Art in London.
- 16 William Gibson, Neuromancer, Victor Gollancz Ltd. London 1984
- 17 Myron Krueger, the father of 'artificial reality' states his ideas about art and science.
- 18 Mort Heilig, cinematographer.
- 19 Scott Ficsher, set out to develop an interface system hat could engage all senses, thrusting the viewer into a realm of full sensory immersion. Telepresence 1985
- 20 Ascott, 'Behaviourist Art and the Cybernetic Vision'.
- 21 John Cage, in 1940 he developed the provocative 'theater of mixed means' in collaboration with artists R. Rauschenberg, J. Johns and the choreographer M. Cunningham.
- 22 Allan Kaprow led the movement into the pop culture that characterised the 1960's.
- 23 Athens 1999.
- 24 A case study of visual simulation with AR, Imagina 2000.
- 25 Ways of Seeing (J. Berger)
- 26 Daniel Sardini 1992.
- 27 Silicon Graphics, Inc.,
- 28 The CUBE was created in February 2000 by three Entertainment Technology Masters students at Carnegie Mellon University. The primary goal of the project was to explore the immersive potential of a small, CAVE-like display device for real-time interaction. The team was interested in investigating the largely unexplored continuum between full-sized CAVEs and head-mounted displays.
- 29 Computer generated images
- 30 Hellenic Foundation
- 31 a result from interviews with 50 people and from the author's personal experience
- 32 Hellenic Foundation, Athens 1999
- 33 Interview result

- 34 Interview result
- 35 Interview results
- 36 One of the most influential artist of the 20th century, a precursor of Dada, Surrealism, Conceptual and Op art.
- 37 Claes Oldenburg, is one of the leading figures of American Pop art in the early 1960's. He was a very early pioneer of environment or installation art.
- 38 Jeffrey Shaw, studied architecture at the University of Melbourne, sculpture at Brera Academy in Milan and St. Martin's School of Art, London. He is a founding member of the Eventstructure Research Group in Amsterdam (1969-80). Since 1991 he has been director of the Institute for Visual Media at the ZKM Center for Art and Media Karlsruhe.
- 39 Bill Viola, artist worked with video, he is experimented with new media. Dataspace (1983).
- 40 J.M.Schaeffer, 23/3/1996 lecture.
- 41 Marc Canter, the founder of the MICROMEDIA Company.
- 42 Interview result
- 43 Landscape One is a multi-user interactive panoramic installation using 4 networks computers with touch pads and microphones, 4 video projectors and 4 laser disc players.
- 44 Mitologies Performance
- 45 Opinions of performance participants
- 46 ISEA 94
- 47 Bill Kluver, A Swedish technician working on Laser Systems for Bell Laboratories (New Jersey)
- 48 Peter Weibel, curatorial essay, ART/POLITICS IN THE ON LINE UNIVERSE.
- 49 Paul Cezane, (1839-1906) France
- 50 Paul Gauguin (1848-1903)
- 51 By Paul Kaiser/Shelley Eshkar/Bill T. Jones.
- 52 Interview results
- 53 Christa Sommerer & Laurent Mignonneau
- 54 Interactor's opinion from his experience into '*KALI The Goddess of Millennium*' performance.
- 55 George Steiner, La nostalgia del assoluto, Mondadori 2000.
- 56 Interview results
- 57 57 Interview from La Repubblica 1999
- 58 Charles Lalaux, (1877-1953). French aesthetician that studied the relationship between society and art.
- 59 Interview results.
- 60 Interview results
- 61 A technology that tracks sensors attached to a moving body.
- 62 Samuel Blumenfeld – Michel Guerrin, The end of Art?, Vima/Le Monde, 5/12/99 p10
- 63 Henri Matisse 1869-1954, 'The snail', (1953: Tate modern)
- 64 Saul Bass -1996, graphic designer established movie title sequences
- 65 Jean Arp 1886-1966, 'Constellation According to the Laws of Chance' (1930: Tate modern)
- 66 These systems are mostly constructed by Silicon Graphics. Similar systems are used by the performances created by the Hellenic Foundation Athens, Greece.
- 67 Pombour Museum from the conference Actualising the Virtual
- 68 Fractal is a mathematical concept but it does not appear in an approximate form in certain natural forms.
- 69 Interview results.
- 70 It is supposed to have been discovered by the Greek astronomist Hyperchos
- 71 Centre. G.Pompidou, 'Actualising the virtual' (1992)
- 72 Lynn Hersam in Deepcontact (1984-89) uses a touch screen interface, that the viewer can reach through the work's glass surface, the computer's 'fourth wall'. This type of interactivity constitutes a transgression of the screen, transporting the viewer into virtual worlds.
- 73 Agency, is the satisfying power to take meaningful action and see the results of our decisions and choices. J.H. Murray (1998:126)

- 74 The choices presented in this room are the four coloured doors, a white, a red, a black, and a "pale" door. These colours represent the colours of the horses as described in the Apocalypse, indicating that the woodcut room that follows is that of the "Four Horsemen".
- 75 A Greek Hellenic Foundation game through which children learn about Byzantine costumes.
- 76 Interview results
- 77 Interview M. Roussos, Virtual Reality Team Coordinator, Foundation of the Hellenic World
- 78 Paul Kaiser/Shelley Eshkar/Bill T. Jones (Prix Ars Electronica 1999)
- 79 Kali as a metaphor of the jungle *'the spear of the Queen'*
- 80 The art of drawing and the meaning of colour –rule of the Sanscrit colour code.
- 81 At the end of 1700, men in France replaced gold with black in their clothes, this was termed as the 'the denial' towards the Renaissance movement.
- 82 According to the apocalyptic literature, the pale horse carries Death.
- 83 Participant's sense during the performance experience
- 84 Capture Lab, environmental color was applied to make the surrounds more conducive... Mantei (1988).
- 85 Of course there is a history of experiments with more visceral forms of spectation including 3D films during the 1950's and their reincarnation in the contemporary period.
- 86 100 people questioned and express their opinion on these characteristics.
- 87 'Media-in-Transition' conference MIT October 1999
- 88 Koala (Robot) which lives in his real ambience and it is strongly related with the Virtual world through Ying.
- 89 Travelling a horizontal camera movement on a track.
- 90 Kali the goddess of the millennium (2000), performance,
- 91 An adventure in a labyrinth of information, *'its lasting appeal as both a story and a game pattern derives from the melding of cognitive problem (finding the path) ...'* J.H. Murray (1998:130)
- 92 "The Goddess of the Millennium", Author: Franz Fischnaller, F.A.B.R.I.CATORS (2000): Milan/Italy.
- 93 Interview results
- 94 Mitologies, Avatars, Kali.
- 95 Interview results
- 96 Ying Yang City is the mother world and encompasses the beginning and the end of eight different virtual worlds in which the avatars coexist.
- 97 KALI The Goddess of the Millennium, (2000) Franz Fischnaller F.A.B.R.I.CATORS - Milano/Italy
- 98 Interview Results.
- 99 Stelarc, Stelios Arcadiou
- 100 The head of the Ars Electronica Centre (interview)

B I B L I O G R A P H Y

BOOKS

- Abanindra Nath Tagore., (1997). Σαντάγκα ή οι έξι κανόνες της ζωγραφικής. Αθήνα: Ακρίτας.
- Adorno, (1967), Parva Astetica. Frunkfurt: A.M. Albany.
- Arneheim R., (1974). Art Visual Perception, A psychology of the creative eye. University California Press.
- Balaz B., (1970), Theory of the film. NY:Dover.
- Barnard M., (1998), Art, design and visual culture. New York: St. Martin's Press.
- Benjamin W., (1969), The Work of Art in the Age of Mechanical. Reproduction in *Illuminations*, ed. Hannah Arendt New York: Schochen Books.
- Berger J., (1989), Ways of seeing. Αθήνα: Οδυσσέας.
- Berkeley G., (1707), A new Theory of Vision. London:Everyman.
- Bernard, (1914), Kant's Critique du Judgment. (2nd ed.) London.
- Beverley, J. (1993), Against Literature Minneapolis: University of Minnesota Press.
- Birn J. (2000). Digital Lighting Rerndering. U.S: New Riders.
- Blazwick I., (2000) Tate modern: the handbook. London: The tate Gallery.
- Branczyk A., (1999), Emotional digital: a sourcebook of contemporary typographics. London: Thames and Hudson.
- Breadsley, (1989), History of Aesthetic Theory. Athens: Nefeli.
- Brockman, J. (1995), The Third Culture: Beyond the Scieatific Revolution. Simon & Schuster.
- Brook P., (1999), The shifting point. Αθήνα: Εστία.
- Castells, M. (1993), The New Global Economy in the Information Age. Penn State University Press.
- Chevalier D. (1969), Picasso, the blue and rose period. New York: Crown Publishers.
- Chip Morningstar and F. Randall Farmer, The Lessons of Lucasfilm's Habitat, io Cyberspace: First Steps. Cambridge, MA: The MIT Press.
- Collingwood R.G. (1938), The Principles of Art. Oxford: Clarendon Press.
- ConleyVerona, editor, (1993), Re-Thinking Technologies. Minneapolis: Universtity of Minnesota Press.
- Crary J., (1991), Techniques of the Observer. Massachusetts: MIT Press, Cambridge.
- Cyberarts 96/ Prix Ars Electronica. New York: Springer Verlag.
- Cyberarts 97/ Prix Ars Electronica. New York: Springer Verlag.
- Cyberarts 98/ Prix Ars Electronica. New York: Springer Verlag.
- Cyberarts 99/ Prix Ars Electronica. New York: Springer Verlag.
- Deikman A. (1990). Deautomatization and the Mystical Experience In Altered States of Consciousness. (3rd. ed.), Harper Collins.
- Deleuze, G.& Felix Guattari (1983), Rhizome. In: On the Line. Transl. John Johnston. Semiotext(e).
- Druckrey T.(edited)(1996), Electronic Culture. Canada: Aperture.
- Eco U., (1983), Faith in Fakes travels io Hyperreality. NY: Minerva.
- EDS. R.A. Braden and A.D. Walker (1982) Bloomington:International Visual Literacy Association.
- Fischer E., (1981), The necessity of art. Αθήνα: Θεμέλιο.
- Gaarder J., (1994), Ο κόσμος της Σοφίας. Αθήνα: Νέα Σύνορα- Α.Α. Λιβάνη.
- Gazzarida M. (1995), The Social Brain New York: Basic Books.

- Geertz, C. (1997), After the Fact, Two Countries, Four Decades, One Anthropologist. Mass.:Harvard University Press.
- Gibson W., (1984), Neuromancer. New York: Ace Books.
- Gill, K. S. (1996), Human Machine Symbiosis, The Foundations of Human-centered System Design. USA: Springer.
- Gleick, J (1987), Chaos. The Making of a New Science. New York: Viking Penguin.
- Goethe, J., (1970), Theory of colours. Eastlake.
- Goldeberg, R., (1996), Performance Art, from futurism to the present. Singapore: Thames and Hudson.
- Gombrich E.H., (1960), Art and Illusion Princeton: Princeton University Press. Roland B., (1977).
- Gombrich E. H., (1995), Τέχνη και ψευδαίσθηση. Αθήνα: Νεφέλη.
- Gouhier H., (1985), Το θέατρο και η ύπαρξη Αθήνα: Καρδάμυτσα.
- Greek Tourist Guide, (1999) 101 Maps. Athens: Dourakos.
- Greiman A., (1998), Floating ideas into time and space. New York: Watson- Gupill Publications.
- Greiman A., (1998), Floating Ideas into time and space. NY: Watson -Gupill.
- Haraway, D Simians (1991), Cyborgs and Women Free Association Books, London.
- Heidegger M. (1971), What are Poets For? Poetry, Language and Thought, Harper & Row.
- Heim M. (1993), The Metaphysics of Virtual Reality. New York: Oxford University Press.
- Heim M. (1998), Virtual Realism. New York: Oxford University Press.
- Hirsch, E.D. (1988), Cultural Literacy, What every American needs to know. New York: Vintage Books.
- Holtzman. S.R.(1996), Digital Mantras: The Languages of Abstract and Virtual Worlds. (4th. Ed.) Massachusetts: The MIT Press.
- Holtzman. S.R.(1998), Digital Mosaics: The Aesthetics of Cyberspace New York:Touchstone.
- Human Interface Guidelines (1993), The Apple Desktop Interface . Mass: Addison Wesley: Reading.
- Ioannou A., (1974), Η Ελληνική Ζωγραφική 19^{ος} Αιώνας. Αθήνα: Μέλισσα.
- Jakobson R., (1960), Closing Statement: Linguistics and Poetics, in Style In Language, ed. Thomas Sebeok Cambridge, Mass.: The MIT Press.
- Kandinsky W., (1980), Point-Ligne-Plan. Αθήνα: Δωδώνη.
- Kandinsky W., (1981), Για το πνευματικό στην τέχνη. Αθήνα: Νεφέλη.
- Kant I. (1963), Analytic of the beautiful. New York.
- Kittler F., (1992), A Conversation between Peter Weibel and Friedrich Kittler. Cologne: Robert Fleck.
- Lacan J., (1977), Ecrits.New York, London: WWNorton & Company.
- Lacan J., (1981), The Four Fundamental Concepts of Psycho-Analysis, New York, London: WWNorton & Company.
- Latour, B. (1993), We Have Never Been Modern. Mass.: Harvard University Press.Prigogine, I., & I. Stengers (1983), Order out of Chaos. New York: Bantam Books.
- Laurel B. (1990), The Art of Human Computer Interface Desing. Usa: Addison-Wesley.
- Laurel B. (1999), Computers as theaters. Usa: Addison-Wesley.
- Levy P., (1999), Qu' est-ce que le virtuel?. Αθήνα: Κριτική.
- Lotman I., (1989), Esthetique et semiotique du cinema. Αθήνα: Θεωρεία.
- Lotman I., (1989), Esthetique et semiotique du cinema. Αθήνα: Θεωρεία.
- Mamet D., (2000), David Mamet on directing film. Αθήνα: Πατάκης.

- Mantovani G., (2000), New Communication Environments From Every day to Virtual. Taylor & Francis. Massachusetts: The MIT Press.
- Michael B. (1991), Cyberspace: First Steps Cambridge, Mass.: The MIT Press.
- Mirzoeff N., (2000), Visual Culture. (2nd ed.), London: Routledge.
- Morris M., (1992), Ψηφιακή Σχεδίαση. Αθήνα: Τεχνικό Επιμελητήριο Ελλάδας.
- Morse M. (1998), Virtualities: Television, Media Art, and Cyberspace. Indiana: Indiana University Press.
- Mosser A. & D. Macleod. Ed. (1996), Immersed in Technology: Art and Virtual Environments. Massachusetts: The MIT Press.
- Mullet, Kevin; Sano, Darell, (1995), Designing visual interfaces: communication oriented techniques. USA: Sunsoft press.
- Murray J., (1999). Hamlet on the Holodeck: the future of narrative in Cyberspace. (2nd ed.).
- Myron W. Krueger (1993), Artificial Reality, New Media Technologies, Sydney, Australian Film, Television & Radio School: RossHarley.
- Nerlich, Michael (1987), Ideology of Adventure: Studies in Modern Consciousness, 1100-1750, 2 vols, trans Ruth Crowley, University of, Minneapolis: Minnesota Press.
- Peitgen, H O & Richter, (1986), PH The Beauty of Fractals. Images of Complex Dynamical Systems Berlin: Springer Verlag.
- Perree P., (1994), Εισαγωγή στη Βιντεοτέχνη. Αθήνα: Σχολή Κινηματογράφου και τηλεόρασης Σταυράκου.
- Popper F., (1993), Art of the Electronic Age. New York: Thames & Hudson.
- R.A. Braden and J.A. Hortin, (1982), Identifying the Theoretical Foundations of Visual Literacy, in Television and Visual Literacy Association.
- Read Herbert (1969), Η φιλοσοφία της μοντέρνας τέχνης. Αθήνα: Κάλβος.
- Reed H, (1992), Πεντε δοκίμια για την τέχνη. Η αισθητική του φιλμ. Αθήνα: Μπουκουμάνη.
- Rheingold H. (1991), Virtual Reality New York: Simon & Schuster.
- Rudestam K., Newton R. (2001), Surviving your dissertation: a comprehensive guide to content and process. (2nd ed.) USA: Sage Publications, Inc.
- Scheibler In. (1993), Heidegger and the Rhetoric of Submission: Technology and Passivity. Re-Thinking Technologies, Verona Conley, University of Minnesota Press.
- Schwarz H., (1997), Are our eyes target?: Media Art History. Munich: Prestel.
- Serota N., (1999), Experience or interpretation- the dilemma of museums of modern art. Αθήνα: Αγα.
- Seward Barry A. M, (1997), Visual Intelligence (perception, image, and manipulation in visual communication). USA: State University Press,
- Singh G., Feiner S.K. & Thalmann D. (1994), Virtual Reality Software & Technology: Proceedings of VRST '94 Conference. Singapore: World Scientific Publishing Co. Pte. Ltd..
- Stake R. (1995), The Art of Case Study research. USA: Sage Publications, Inc.
- Stephenson N., (1992), Snow Crash New York: Bantam Books.
- Stevens W., (1982), Esthetique du Mal. The Collected Poems, New York: Vintage.
- Szathmary A., (1937), The Aesthetic theory of Bergson. Harvard University Press.
- Taine H., (1985), The philosophy of Art. New York: Lecture on Art.
- Taylor & francis, (1995), Pictorial Communication in Virtual and Real Environments, Technoscience and cyberculture, Routledge.
- The Death of the Author in Image, Music, Text, ed. Stephen Heath New York: Farrar, Straus and Giroux.
- Turkle. (1984), The Second Self: Computers and the Human Spirit New York: Simon & Schuster.
- Valery P., (1960), Oeuvres, vol. II (Bibl. De la PLEIADE, Gallimard), Paris.

- Vince J. (1992), Computer Graphics. U.K.: The Design Council.
- Vince J. (1998), Essential Virtual Reality fast: how to understand the techniques and potential of virtual reality. London.: Springer-Verlag.
- Walter B. (1978), Δοκίμια για την Τέχνη Αθήνα: Κάλβος.
- Walther I., (1989), Paul Gauguin. Copenhagen: Taschen B., Verlag GmbH & Co. KG.
- Winograd, T. & P. Adler (1992), Usability, Turning Technologies into Tools. Oxford University Press.
- Wollen P., (1969), Signs and Meaning in the Cinema. Αθήνα: Κάλβος.
- Αϊζενσταϊν Σ.Μ. (1985), Εργα 1-2 Η μορφή του Φιλμ Αθήνα: Αιγόκερως.
- Ανδρόνικος Μ., (1986), Ο Πλάτων και η τέχνη. Αθήνα: Νεφέλη.
- Αριστοτέλης., (1997), Απαντα 40, περί ψυχής. Αθήνα: Κάκτος.
- Αριστοτέλης., (1999), Περί ποιητικής. Αθήνα: Εστία.
- Γεωργίου Θ. (1989), Σε τι χρησιμεύει η αισθητική. Αθήνα: Σμίλη.
- Γιανναράς Α. (1980), Θέματα Παραδοσιακής και Σύγχρονης Αισθητικής, Αθήνα: Παπαζήση.
- Κυριαζή Ν. (1999), Η κοινωνιολογική Έρευνα, κριτική επισκόπηση των μεθόδων και των τεχνικών. Αθήνα: Ελληνικά Γράμματα.
- Μούρελος Γ., (1985), Θέματα Αισθητικής και Φιλοσοφίας της Τέχνης: Οι βιολογικές και ψυχολογικές βάσεις των καλών τεχνών. Αθήνα: Νεφέλη.
- Μούρελος Γ., (1985), Θέματα Αισθητικής και Φιλοσοφίας της Τέχνης: Οι κοινωνικές βάσεις των καλών τεχνών, (Τόμος β). Αθήνα: Νεφέλη.
- Μπαλαζ Μ., (1992), Η δημιουργική Κάμερα. Αθήνα: Αιγόκερως.
- Σωτηροπούλου Χ., (1995), Η διασπορά στον Ελληνικό κινηματογράφο. Αθήνα: Θεμέλιο.
- Χατζηκυριάκος-Γκίκας Ν., (1987), Η Γέννηση της Νέας Τέχνης. Αθήνα: Αστρολάβος/Ευθύνη.

ARTICLES

- Baskozos N., (January 2000), Η αγορά των ιδεών. Οικονομικός, pp.36.
- Blumenfeld S. -Guerrin M., (5/12/99) "The end of Art?", Vima/Le Monde, pp10.
- Botsinelli E.- interview extract, La Repubblica.
- Coyne, R., (1994) "Heidegger & Virtual Reality: The Implications of Heidegger's Thinking for Computer Representations," Leonardo, (27), pp 1, MIT Press.
- Dalloni M., (5/12/99), The Vima/Le Monde, pp.4.
- Gigliotti, C. (1995) "Aesthetics of a Virtual World." Leonardo: Journal of the International Society for the Art Sciences and Technology (28) pp4.
- Gilkey, R. and Weisenberger J., (Fall 1995), "The Sense of Presence for the Suddenly Deafened Adult: Implications for Virtual Environments," Presence, (4), pp 4.
- Karpinski, R., (July 3, 1995), "Chat Comes to the Web," Interactive Age, pp 6.
- Lohisou S., (July 1999), Monsters of Grace. BHMA, pp.35.
- Manovich Lev, (September 1992), . Assembling Reality: Myths of Computer Graphics Afterimage 20, no. 2 pp.12-14.
- Manovich, L., (1996). "The Aesthetics of Virtual Worlds," CTHEORY (19), pp 1-2.
- McRobert, L. (Autumn 1996) "Immersive Art and the Essence of Technology." Explorations: Journal for Adventurous Thought.
- Papaspoulos S., (17/10/1999), "Αναλωσέτο ξανά" Ελευθεροτυπία (18) pp.66.
- Plaketsis Th., (August 2000), Δίψα για το απόλυτο. Κυριακάτικη, pp.19.
- Plaketsis Th., (October 1999), Στα δεσμά της τεχνικής. Κυριακάτικη, pp.22.

- Robertson B, (May 1992), Those Amazing Flying Machines. Computer Graphics World pp69.
- Robertson, B., (1994) "Char Davies: Computer Artist," Computer Artist, (3), pp2 Feb/Mar.
- Springel S. (June 1999), Curtain rises on DIY drama. The Times Higher, pp.15.
- Steiner G., (2000), "La nostalgia del assoluto", Mondadori.
- Topali M., (23/7/1999) "Transforming Nisiros to a .. remote-control", Vima, pp.3/23.
- Vatopoulos N. (May 1999), Ο τελευταίος σπασμός. Minima, pp.44-47.
- Weintraub, A. (1996) "Artifice, Artifact: The Landscape of the Constructed Digital Environment," Leonardo, (28), pp5.
- XANADU 1987 (Computer Lib/Dream Machines). Seattle, Wash.: Microsopft Press.
- Ουμπέρτο Γκαλμπερτί απόσπασμα απο συζήτηση, La Repubblica.

FORUMS

22. Tikka, Heidi. "Cyberspace: A Feminist Point of View." Paper presented at Mu Media Festival, Helsinki, 1996.
- Brenda Laurel Grids, Guys and Gals: Are you oppressed by the Cartesian Coordinate System?, SIGGRAPH 95 panel session.
- Davies, Char. "Osmose: Notes on Being in Immersive Virtual Space," ISEA '95 Conference Proceedings, 1995 (Montreal).
- Davies, Char. "The Paradox of Being in Immersive Virtual Space," SIGGRAPH 96 panel, Soul in the Machine, The Search for Spirituality in Cyberspace.
- Davis, Eric, "Osmose," Wired, 4.08, August, 1996.
- Jones B. Computer Imagery: Imitation & Representation of Realities. SIGGRAPH 89 Art Show Proceedings, 1989.
- NSF's interactive System Program, a two-day invitational workshop was held March 23-24, 1992.
- Osmose Book of Comments. Comments written by immersants during the exhibition at the Montreal Museum of Contemporary Art, 1995.
- Pantheon, 1986), p.35. In: Computer Graphics: Visual Proceedings (ACM Siggraph, Annual Conference Series, 1993), pp.159-163.
- Roy Acott, Fourth International Symposium on Electronic Art, FISEA 1993 Catalogue, pp. 4
- See Lev Manovich, "Mapping Space: Perspective, Radar and Computer Graphics," in SIGGRAPH '93
- Tikka, Heidi. "Vision & Dominance: A Critical Look at Interactive Systems." ISEA '94 Proceedings, Helsinki, 1994.
- Virtual World Entertainment, Inc., Press Release, SIGGRAPH '95, Los Angeles, August 6-11, 1995.
- Visual Proceedings, ed. Simon Penny (New York: ACM, 1993).
- Wertheim, Margaret. "Osmose, Char Davies Organo-Virtual Odyssey." Metropolis, September 1996.
- Wright, Richard. "The Image in Art & Computer Art." SIGGRAPH 89 Art Show Proceedings, ACM SIGGRAPH, New York, 1989.

INTERNET / CD ROM

- Actualizing the virtual, Centre Geroges Pompidou. Cd-rom.
- Bolter, D.J. On-line: <http://www.wired.com/wired/5.01>.
- Castells, M. (1996). <http://sap.mit.edu/projects/colloquium/summaries/castells.html>.
- Gavin Bell, Anthony Parisi and Mark Pesce, "The Virtual Reality Modeling Language. Version 1.0.

- <http://www.cooper.mn.1994>.
- <http://www.cyberspace/gibson>
- <http://www.dordogne>.
- <http://www.egyptian.art>.
- <http://www.Illinois/cave>.
- <http://www.Imagina>, 2000.
- <http://www.philip.glass>.
- <http://www.Virtual.arts/ghostcatching>.
- <http://www.esf.ch/ben/fluxus1.html>.
- [http://www.interval.com/projects/placeholder/Hypertext/Worlds/Waterfall/World 1.html](http://www.interval.com/projects/placeholder/Hypertext/Worlds/Waterfall/World%201.html).
- <http://www.labart.univ-paris8.fr/artifice/artifices/4/duguet.html>.
- [http://www.modern.art/New York](http://www.modern.art/New.York).
- <http://www.ubique.com/>.
- [http://www.uniart.com/ Hellenic Foundation/](http://www.uniart.com/Hellenic.Foundation/)
- <http://www.uniart.com/>.
- <http://www.uniart.com/>.
- [http://www.uniart.com/Bill Viola](http://www.uniart.com/Bill.Viola).
- [http://www.uniart.com/Media History](http://www.uniart.com/Media.History).
- <http://www.viewpoint.com/>.
- <http://www.virtpark.com/factinfo.html>.
- <http://www.worlds.net/alphaworld/>.
- <http://www.worlds.net/info/aboutus.html>.
- <http://www.worlds.net/info/aboutus.html>.
- http://www.ils.nwu.edu/~e_for_e/nodes/I-M-INTRO-ZOOMER-pg.html.
- Mark Pesce, Peter Kennard and Anthony Parisi, "Cyberspace." WWW document.
- Media History, ZKM, karlsruhe. Cd-rom.
- Norman, D. (1994). *Defending Human Attributes in the age of the Machine*. CD-ROM: Voyager.
- Rutledge, Virginia, "Reality by Other Means," *Art in America*, June 1996.
- Schank, R. (1995).
- Sobchack, Vivian "A Theory of Everything: Meditations on Total Chaos", *Artforum*, November, 1990.
- Specfication, May 26, 1995. WWW document. <http://www.ubique.com/places/gallery.html>.

APPENDICES

1. QUESTIONNAIRES RESULTS

Questionnaire 1

Questionnaire 2

2. INTERVIEWS

Semi structure interview forms addressed to artists.

Samples from the interview answers.

3. OPINIONS

4. CASE STUDIES EXPERIENCE

QUESTIONNAIRE 1

WHAT IS YOUR AGE:	15 or younger	<input type="checkbox"/>
	15-20	<input type="checkbox"/>
	20-25	<input type="checkbox"/>
	25-30	<input type="checkbox"/>
	30 or older	<input type="checkbox"/>

1.ARE YOU AN INTERNET USER?
(please tick)

<input type="checkbox"/>	<input type="checkbox"/>
YES	NO

2.ARE YOU A VIDEO GAME USER?
(please tick)

<input type="checkbox"/>	<input type="checkbox"/>
YES	NO

3. ARE YOU INTERESTED TO ENTERTAIN YOURSELF IN SELECTING A NEW TYPE OF ENTERTAINMENT?
(please tick)

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
a great deal	a certain amount	not at all

4. WHAT TYPE OF ENTERTAINMENT DO YOU PREFER?
(please tick)

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
tv series	feature films	theater	video games

5. IF YOU HAVE NOT ALREADY EXPERIENCE A VIRTUAL PERFORMANCE WOULD YOU WISH TO DO SO?
(please tick)

☐

a great deal

☐

a certain amount

☐

not at all

6. WHAT ARE YOUR FEELINGS REACTIONS INTO VIRTUAL PERFORMANCES?
(please tick)

☐

positive

☐

negative

☐

Indifferently

7. CAN YOU ACCEPT VIRTUAL PERFORMANCES AS AN EDUCATIONAL MEDIUM?
(please tick)

☐

a great deal

☐

a certain amount

☐

not at all

8. TO WHAT EXTENT ARE YOU INVOLVED IN THE V. PERFORMANCES?
(please tick)

☐

a great deal

☐

a certain amount

☐

not at all

9. WHAT ARE YOUR REACTIONS, WHIST EXPERIENCING A VIRTUAL PERFORMANCE?
(please tick)

☐

natural

☐

unnatural

10. DO YOU REACT IN A SIMILAR OF DIFFERENT MANNER IN COMPARISON TO YOUR DAILY BEHAVIOUR IN A VIRTUAL PERFORMANCE?
(please tick)

☐

same

☐

different

11. HOW DO YOU FEEL, WHIST EXPERIENCING A VIRTUAL PERFORMANCE?
(please tick)

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
happy	unhappy	exciting	it depends

12. YOUR FEELINGS ARE, WHIST EXPERIENCING A VIRTUAL PERFORMANCE IN COMPARISON TO YOUR DAILY REACTIONS?
(please tick)

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
equally intense	less intense	more intense

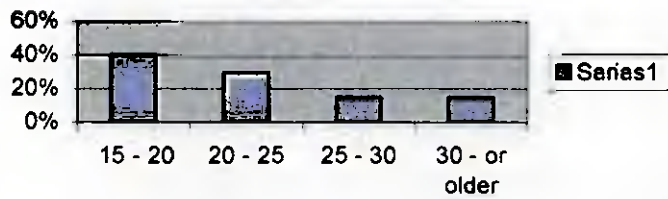
13. WHAT ARE THE ELEMENTS THAT DIFFERENCIATE A VIRTUAL PERFORMANCE FROM A TRADITIONAL ONE, ACCORDING TO YOUR OPINION.?
(please note)

.....

.....

.....

QUESTIONNAIRE SAMPLE



QUESTION 1



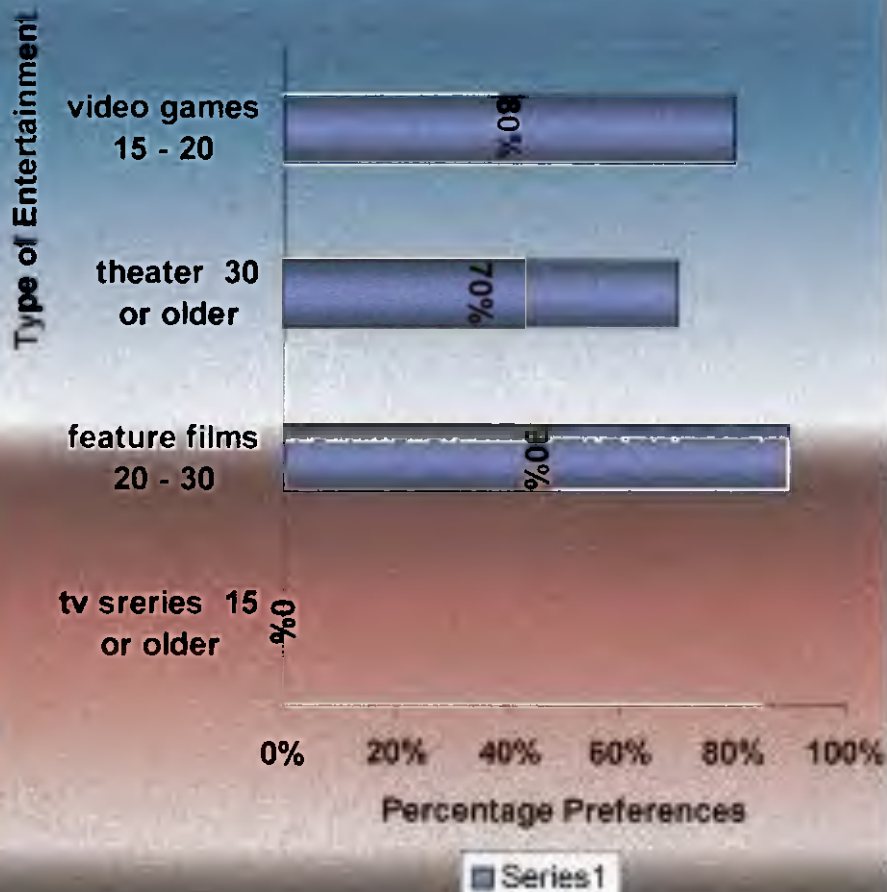
QUESTION 2



QUESTION 3



Question 4



QUESTION 5



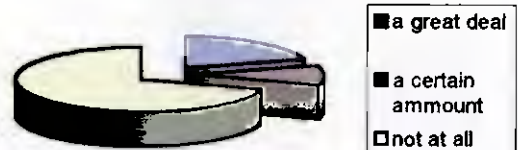
QUESTION 6



QUESTION 7



QUESTION 8



QUESTION 9



QUESTION 10



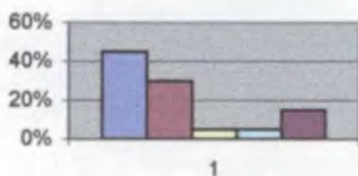
QUESTION 11



QUESTION 12



QUESTION 13



- ☒ interactive
- ☒ plot development
- ☐ view the story from my own perspective
- ☐ get into the story

QUESTIONNAIRE 2

WHAT IS YOUR AGE:	15 or younger	<input type="checkbox"/>
	15-20	<input type="checkbox"/>
	20-25	<input type="checkbox"/>
	25-30	<input type="checkbox"/>
	30 or older	<input type="checkbox"/>

1.DO YOU HAVE AN ARTISTIC EDUCATIONAL BACKGROUND?
(please tick)

<input type="checkbox"/>	<input type="checkbox"/>
YES	NO

2.TO WHAT EXTENT ARE YOU INVOLVED IN THE V. PERFORMANCES?
(please tick)

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
a great deal	a certain amount	not at all

3. THE INTERACTIVE ELEMENT/FACTOR INTEREST YOU?
(please tick)

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
a great deal	a certain amount	not at all

4. WHY DO YOU FIND IT INTERESTING?
(please note)

.....

.....

.....

5. WHAT IS YOUR OPINION ON YOUR PARTICIPATION IN A VIRTUAL PERFORMANCE (PLOT DEVELOPMENT)?
(please tick)

☐

very interesting

☐

interesting

☐

not at all interesting

6. DO YOU THINK THAT NAVIGATION IS AN IMPORTANT FACTOR IN VIRTUAL PERFORMANCES?
(please tick)

☐

a great deal

☐

a certain amount

☐

not at all

7. WHAT ARE YOUR EXPECTATIONS WHILE EXPERIENCING A VIRTUAL PERFORMANCE,
(please tick)

☐

experience a natural adventure

or

experience a fictional one

☐

both

☐

8. WHAT ARE YOUR REACTIONS, WHIST EXPERIENCING A VIRTUAL PERFORMANCE MADE BY NATURAL ELEMENTS (BACKGROUNDS, OBJECTS)
(please tick)

☐

possitive

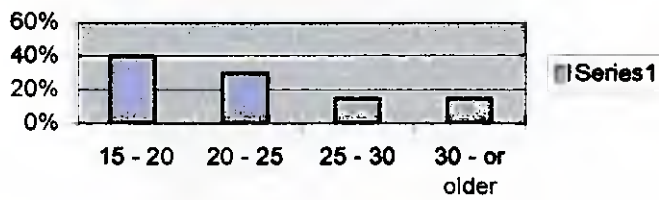
☐

not at all possitive

☐

depends on the performance type

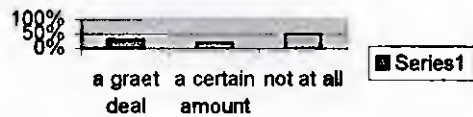
QUESTIONNAIRE SAMPLE



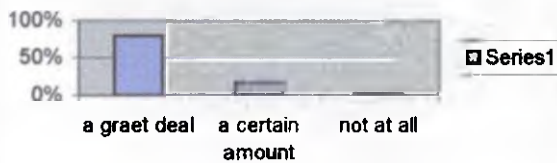
QUESTION 1



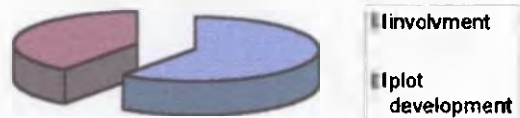
QUESTION 2



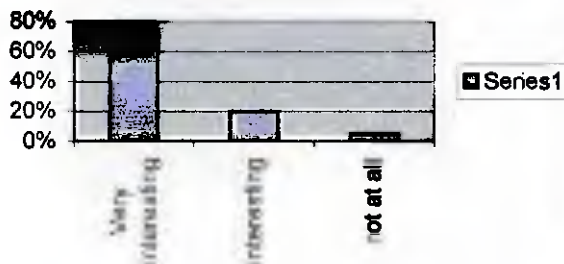
QUESTION 3



QUESTION 4



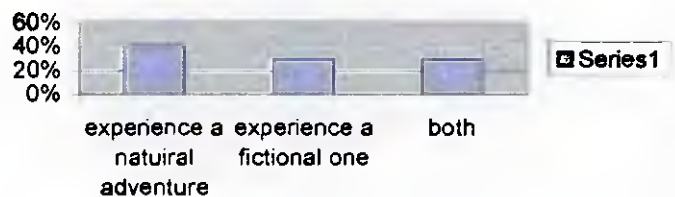
QUESTION 5



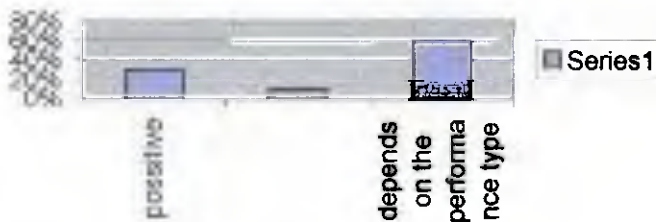
QUESTION 6



QUESTION 7



QUESTION 8



SEMI-STRUCTURE INTERVIEW FORM 1
ADDRESSED TO ARTISTS

1. Are artists fully exploring the transcultural potential richness of emergent computer-mediated communication technologies?
2. Can Electronic Art speak a multicultural language?
3. Would it benefit from doing so?
4. Which are the dominant cultural values that underlie computer-related technologies today?
5. In a world of social, cultural and economic disparities, how can technology meet basic human needs in both developed and developing countries?
6. How we can be sure that imaginary actions will not have real results?
7. How we can act our fantasies without becoming paralysed by anxiety?
8. What do we really mean when we talk about beauty?
9. What kind of space is a virtual performance space?

SEMI-STRUCTURE INTERVIEW FORM 2
ADDRESSED TO ARTISTS

1. What were the experiences that you derived from your involvement in Ves Art?
2. How did the experience affect you?
3. What elements of traditional Art have you retained?
4. What were the new elements that you used in your Art created in the Ves?
5. Is it Art according to your opinion?
6. How does the interactive element operate?
7. How do you face and deal with the unfolding narration?
8. What elements did you use to achieve immersion ?
9. Do you work with video, computer animation or a combination of both?
10. Do artists fully explore the transcultural richness of emerge computer-mediated communication technologies?
11. Can Electronic Art speak a multicultural language?
12. Would it benefit from doing so?
13. How do you approach the participant?

Samples from the interviews answers.

QUESTION: What kind of space is a virtual performance space?

Lev Manovich

At first glance, 3D computer graphics, the main technology of creating virtual spaces, exemplify Panofsky's concept of Renaissance "systematic" space which exists prior to the objects. Indeed, the Cartesian coordinate system is hardwired into computer graphics software and often into the hardware itself. When a designer launches a modeling program, he is typically presented with an empty space defined by a perspectival grid, the space that will be gradually filled by the objects he will create. If the built-in message of a music synthesizer is a sine wave, the built-in world of computer graphics is an empty Renaissance space, the coordinate system itself.

Yet computer generated worlds are actually much more "haptic" and "aggregate" than "optic" and "systematic." The most commonly used 3D computer graphics technique to create 3D worlds is polygonal modeling. The virtual world created using this technique is a vacuum filled with separate objects defined by rigid boundaries. A perspective projection creates the illusion that these objects belong together but in fact they have no connection to each other. What is missing is space in the sense of space-environment or space-medium: the environment between objects; an atmosphere which unites everything together; the effects of objects on one another.

Another basic technique used in creating virtual worlds - compositing (superimposing, keying) - also leads to an "aggregate" space. It involves superimposing animated characters, still images, Quicktime movies, and other graphical elements over a separate background. A typical scenario may involve an avatar animated in real time in response to the user's commands. The avatar is superimposed over a picture of a room. An avatar is controlled by the user; a picture of a room is provided by a virtual world operator. Because the elements come from different sources and are put together in real time, the result is a series of 2D planes rather than a real 3D environment.

Gwen Reichbach

In virtual reality, a "world" is created that exists entirely in the memory of a computer and in the equipment you are wearing. The computers control what you sense through simulations such as three-dimensional images, sound, artificial smell, and force feedback.

You, in turn, are able to enter and interact with the virtual realities by controlling the computers through equipment such as head-mounted displays (which track your eye and head movements in relation to the simulations) and data gloves (which track your hand movements in relation to the simulations).

An advanced form of virtual reality equipment is the virtual reality CAVE (Cave Automatic Virtual Environment). Developed at the University of Illinois at Chicago, the CAVE provides the illusion of immersion by projecting stereo images on the walls

and floor of a room-sized cube. The CAVE also allows multiple participants to experience the illusion, with one participant controlling the environment. The new Media Union on North Campus includes plans for a CAVE.

QUESTION: How does the interactive element operate?

Gwen Reichbach

The most powerful and complex type of virtual performance is interactive. Here, you can explore the environment and, most importantly, interact with and change it. For instance, in the virtual car interior, if you "touch" a radio button on the car control panel while wearing a data glove, the computer will generate a sound like a radio station. In the virtual chemical plant, students can operate controls to change reactor conditions.

Interactive art often arose out of a cultural critique. In part this critique attacked the separation of art from life and sought to integrate them better by bringing art into everyday settings and by involving non professionals. Another part of the critique focused on a distrust of authority and established institutions: art itself was seen as one of these ossified institutions in need of radical challenge. For some with particular political agendas, extension of the right to function as artist to the masses was part of a more general radical agenda to spread societal participation. Another part of the critique celebrated the individual. Every person was seen as having artistic potential; it was thought that life would be richer both for the individual and for the community if non artists incorporated art consciousness into everyday life. Finally there was the part of the critique that questioned order in general. Interactive art increased the repertoire of actions and thus increased the chance for fruitful randomness.

Many contemporary high tech artists are more focused on the design of systems for creation rather than one particular outcome. Breaking with old traditions of art, they are more interested in the family of possibilities they create than in one particular sensual manifestation. The experience of the interactive artists is useful to those outside of art because of their analysis of the relationship of culture and media, their sensitivity to the relationship between media and audience, and their attention to the aesthetics of interactivity .

Franz Fischaller

My interest in the field of digital media lays in the creation of new forms of Art, interactive installations, and evolution of the media towards integrated Art forms. As an individual who assumes the different roles of author, producer, curator, designer, and project coordinator, I am able to touch upon many fields and cover different experiences that allow me to have a broader view on the issue of cultural heritage.

Maria Stukoff, Nicholas Gebhardt

The aesthetic experience, therefore, is located in the potential for electronic art to reconcile seemingly opposite realms of experience, the human and the

technological, in a conjunction that produces this "New World Order", where art is "no longer a window onto the world but a doorway through which the observer is invited to enter into a world of interaction and transformation. "Interactivity supplants the systematic alienation attributed to industrial society, resolving the dialectical separation of technology (production) from nature (or real life), to produce a new world". . . in which natural intelligence and artificial life can interact creatively. " It is perceived as a natural (or human) force of survival and freedom within the growing rationalisation and determinism of technological systems, of a technological society, that at the same time is irrevocably caught up in maintaining and enhancing those systems.

To recover interaction for art, to render it actual and political as an artistic concept, means reconsidering the kinds of expectations we have of art, and of our lives in a technological society. If we are driven only by the desire to get something back from our machines, to develop artificial intelligence with the hope that it will produce an equity of exchange, that the machines will answer back, in a desperate attempt to humanise the machine, to turn it into a living entity, then art will become a case of simply producing special effects that serve only to amplify the extent (and extension) of the technology, to produce an excess of matter. In this sense the ideology of interactive art is the complete ensnaring of life by a particular history of technology where the emergence of cyberspace, or the space of interaction, is both the aesthetic and material realisation of a future present.

Simon Penny

I'll start by claiming that Western visual arts have no tradition of an esthetics of interactivity, and I'll defend this claim with an inverse taxonomic calculus: If real time interaction is our starting point, then we can say that video or film is a linear record of interaction, and painting or photography a still frame.

We have a well established esthetics of the still image, of color and line, shape and area, of representational geometry and perspective. We have an esthetics of time based image, of camera angle and movement, wipe and cut. But we do not have an esthetic language of real time interaction.

The performing arts are, from this perspective, only different from video and film in that the viewer replaces the camera as the perceiving device. Drama or orchestral music is not 'interactive' in the sense of real time reaction, though improvisation is. Changes of form which occur in the moment, according to the forces of the moment, define improvisation. In conventional drama a director induces the actors to reproduce a version of a script. From this perspective, I am interested in what we might call a meta-script, a script that is the director, that defines in real time, the scripts or roles or behaviors of the 'actors'. To use the improvisation analogy, it is a system which understands something of the context, and responds to the situation at hand.

Such a script can clearly be assessed according to systems of esthetic analysis. It might be anthropomorphic or biomorphic, it might be literal or associative,

compulsive or schizophrenic, aggressive or retiring. If we are serious about autonomous machine based interaction, then 'compared to what' is a central question. Certainly the famous Eliza, and the Turing test before it, are unselfconsciously anthropomorphic and mimetic in their behavior. In their case, 'compared to people' is the answer. When we posit synthetic agent doing work in cyberspace, such as locating references on a certain subject at various sites, the environment of the agent is quite alien to us. It is digital, with little equivalence of the geography and geometry which we inhabit. And yet we must understand it and it must understand us. So the interface becomes the glass of the aquarium in a more dramatic way: we are looking at an alien species in its environment. The interface is the zone of translation. As with neural nets, we will never know how it thinks, how it evolved, we could never assemble it from component parts. We understand only our image of it, which is to say, we extrapolate from our cultural experience examples which carry some traits which seem to have an analogous relationship with what it is we think we're seeing. What we're seeing is of course constituted by our cultural experience. This regress leads those who have faith in any sort of cultural universals spiraling out of control down an objectivity dissolving vortex.

QUESTION: According to your opinion could be art?

Franz Fischaller

If we could insert ourselves into this understanding and realize that there could be no jumps or skips in keeping abreast with the evolutive process...whether it be technology, Art, science, culture, daily life, whatsoever the activity, we would arrive to the conclusion that time, as a chain of events, should not be broken nor should it be wasted for eventually we pay the consequences...This is the dynamic of history.

Tina LaPorta, Lin Hsin, Hsin Bernardo, Uribe Mendoza, Luigi Pagliarini

We usually think of an artwork as a physical object. However, an artwork also lies in the concepts and feelings that are suggested and produced by our intellect. Early computer art was based on batch-processing. Now, with the advances in computer technology, artists can create new art forms based on interactivity. Thus, Virtual Worlds could be one of these, a major new medium based on the collaboration of science, technology and art. The field of Virtual Worlds is concerned with using the computer as a tool to help understand the universe around us. It is like a telescope or a microscope, allowing us to see the unseeable. The sciences of complexity are still very much in its infancy and many of underlying ideas were anticipated by generative art. The early form of computer art were almost entirely exploration of the computer's capacity for generating complex images. Many pieces have explored the theme of how complexity grows from the working of simple rules. As we look back to them, we see now illustrations of the new fractal and chaos theories. Art exists thus as the counterweight and the complement of science, so that the two together complete the human discovery process. Most of the time, scientists seeking to explain or

understand complexity have to create a new visual vocabulary to do this. This is an imaginative and aesthetic act which emphasizes that the creative and understanding acts are inseparable. This is one of the main reason why art plays an important role in the synthesis of virtual worlds.

QUESTION: How do you face and deal with the unfolding narration

Johanna Drucker

A virtual performance as a field, a floating matrix of information not linked by diagrams or story strings. The paths through such fields have to be faced in a spatial/dimensional model, though that is merely a visual abstraction. But if one imagined a three-dimensional matrix along three coordinate axes -- height, depth, width, in which elements were either organized randomly or by affinity, then the 'participant' would browse by moving through the field in a manner I have always envisioned as the 'diving mouse' -- a mouse with a three-dimensional playing field, not a two-dimensional screen. Such a process would have little to do with conventional narrative or reading patterns, and instead, function through free montage. If each of the encountered modules also had the potential to expand through a time-quotient (imagine individual filmic units) then an internal set of time-based factors would also function within the structuring of the "text."

OPINIONS

Jean Batiste BARRIERE

- *Artistic Structure is a kind of an assistant of creation and the plastic expection of the world.*
- *A certain kind of an unfinished work what it's really and a circle authorship to interact the system is nothing but unlicious advertising pits.*

Jeffrey DEITCH

- *All the techniques of VR computaration expand the use of our body.*
- *Our body is the same as always been but our conciousness of the body and the relation between our environment is going to be different. That is V. Reality.*

Jean Marie SCHAEFFER

- *From anthropological point of view the infinity between art and play seems to be obvious since many artistic practices are related to play.*

Karl SIMS

- *With images this is very difficult problem because its very difficult for a computer to understand how interesting or how aesthetical succesful an image is.*
- *The people are only have a limited choice to choose from each time, but the computer also must go to direction that are chosen by the people, so it is also limited.*

Siegfried ZIELINSKY

- *Dealing creatively with the digital text implies be ready cross constantly.*
- *It is very impotant to see digital net as a kind of impossible place.*

Gert LOVING

- *The most emphasis is put on the design of the interface so question how to approach people, how they brause through information , for artists now days is the most important.*
- *The users have their own inititives, especialy on the technical and on hardware sides. This is the most interesting parts.*

George LEGRADY

- *I feel that active programming has becoming a project aesthetic.*

Ann Marie DUQUET

- *The couse of an image which hold a lot of attention to be assistant to interface on display devices to the relationship between the visitors- vieewrs and the image.*
- *We don't know if we can still spaek about the point of view, because traditionally the point of view, presupposed space, a distance from the see. However we know that with synthetic images we can adopte the point of view from inside the scene and the scene may surround us.*

Elizabeth DILLER

- *The interactive piece of art ia as far away from the unique object as we can imagine but on the other hand there is a unique event thus produced.*
- *As far from the choices given to subject, the choices deliminant and it's all upper choosers to make a choice from.*

Scott FISHER

- *Idea of Virtual Reality is a kind of contrudiction would make a little more sense V Envrionments because in fact is an environment you interact with.*
- *If you are share space then ther needs of to be some presentation of each participant. In fuct you can design that represantations you can have an electronic persona you can design how do you appear to the other people in space.*

Yvonne WILHELM

- *For us can realities mean different reality to each other what interfaces what can I create and what tools do the recepients as original observer became a visitor. To help this link this can reavities each other.*

EVE, Virtual Performance configuration

By Jeffrey Shaw (1993)

Its present configuration EVE is constituted by the following components:

1. An air inflated dome, 9 meters high and 12 meters wide. This dome has a revolving door for entry and exit.
2. An industrial robot is located in the center of the dome. This robot arm supports the video projection apparatus at the focal center of the dome, and by rapid movements is able to move the projected image anywhere over the inside surface of the dome.
3. Two LCD video projectors generate a polarised stereo pair of images which are projected onto the dome surface. This rectangular image is approx. 300 cm wide. The visitors inside the dome use polarising spectacles to view the stereoscopic image.
4. One of the visitors to EVE wears a special helmet on which a three dimensional spatial tracking device is mounted. This tracker identifies the direction the viewer is looking. This information is transmitted to the robot arm which positions the projected image accordingly.
5. The projected imagery is generated by a Silicon Graphics Oñyx graphics workstation. A joystick in the viewer's hand allows control of forwards and backwards movement in the data space. The joystick also allows the viewer to choose different data sets.

CASE STUDY No. One

Mitologies, (1998) Concept by: Hisham Bizri and Maria Roussos

Description of the experience

Mitologies is a virtual reality performance created for the CAVE. It is loosely based on the Cretan myth of the Minotaur, the revelation of St. John, Dante's "Inferno", Durer's woodcuts after the revelation, and Borges' Library of Babel. The connections between these sources are central to the unfolding of the narrative.

The title *Mitologies* is derived from the Greek word "mitos," the thread Ariadne gave Theseus to help him find his way out of the Cretan labyrinth. As a participant in *Mitologies* I re-experience allegorically the experience of Theseus. Starting on a boat, I am led by Donatello's statue "Zuccone" down a descending river and into an open area of seven churches, which St. John had addressed in his epistles. The statue then abandons me; alone now I will notice that all seven churches are identical, modeled after a Leonardo Da Vinci sketch of a church that was never built. Surprisingly, the interior of each church opens up into the space of the mosque.

The mosque is the entrance to the labyrinth. Plenty of strange, dark, and misleading passages are constructed to create a labyrinth reminiscent of the labyrinth built by Daedalus. The labyrinth is a web, or "rhizome": every path is connected with every other one. It has no center, no periphery, and no exit because it is potentially infinite. To proceed from one tunnel to another, I must make the right choices. For example, the first room presents to me three words: "Dante," "Theseus," and "Christ." If the letter "T" in any of the words is chosen, then the door leading to the first Durer woodcut is opened. Otherwise, one of the other doors leading to further spaces is opened. Depending on the choice, I would like to experience the woodcuts and other special rooms, such as the astronomy room, geography, music, insects, or the alchemy room. These rooms are central to the progression of the plot, which may be linear, circular, or labyrinthine, depending on my choices.

This structure will finally lead to the last room, in which the encounter with the minotaur himself takes place. The representation of the minotaur is based on Cesare Ripa's death metaphor in *Iconologia*. With the participants, I will attempt to approach the minotaur, a hidden crypt will open under my feet and drag me into a deep hole. This hole leads me again to the beginning of the narration: the boat.

CASE STUDY No. Two

Robots and Avatars dealing with Virtual Illusions A Project by **Franz Fischnaller** - F.A.B.R.I.CATORS/Milano/Italy in collaboration with: **K-Team**, Lausanne/Switzerland
Copyright: Franz Fischnaller 1998

The event will show a sort of "real" world in which one (or two) robot(s) live(s). The robots move just like they were living inside that "real" world, but their actions are strictly related to a Virtual Reality ambience. The spectators not only interact with this world by deciding which places the robot has to reach, but also can interact with it by the means of a light source. Flashing it could in fact produce instinctive reactions such as fear or aggression. At the same time the Virtual worlds and the virtual actions can interpret these events (the light and reaction) with the reproduction of special images or effects.

Description of the experience

I had the ability to interact with each single robot in it's environment, by moving a joystick. This interaction generates a real time reaction in the behaviour of the robot as well in the avatars in the Vr-world, visible on the projection screen at the top of the scenography of the arena " the real world". There are two joysticks. One is to interact with Koala. It is possible to navigate and guide koala in the virtual world. and the other joystick with Ying and Yang the avatars (I had experienced both roles Ying and Yang).

I could command the actions of koala and in consequence the actions of Ying in the Virtual Worlds. Ying the avatar will operate in the virtual worlds and koala will follow-up step by step what his alter ego does..and generate the same actions.

Koala is cloned with it's Avatar Ying, who is present in the virtual world through his avatar ... Ying.

On some occasions, I had observed that Koala moves in a very particular way, in his habitat as if trying to avoid some obstacles, as if he is entering into a cave or trying to overstep an obstruction. The curious thing is that in the real world there is no apparent obstacles ... but in fact there are obstacles. It is only that you do not see them, but koala has the capacity to see them...since he has the virtual vision in his perception and he avoids the obstacles his avatar finds in the Virtual World. Koala the robot can see the obstacles since they become visible in his imagination, they are the objects which exist in the virtual world.

Koala sees what his avatar sees in the virtual world. In other words, he sees through his avatar. Only that while this occurs, I see in the real world smooth sands, without obstacles, while in fact koala is navigating and acting as if he was in the virtual world. It is only his physical body which is placed on the ground but his vision is focused in the virtual world.

Koala will replicate, in real space, the travels of Ying, drawing out the path traversed on the environment of sand. It will seem that he is a sort of somnambulist ... going up and down in a senseless manner. He however, knows where he goes it is only that the human eyes are not able to perceive it until Koala relives the same with traces in the sand.

This means that the physical world is an illusion and that what I see in the virtual world and in my dreams are projections without consistency. More specifically, the avatar, the alter ego, sees objects in the virtual world and reproduces them in the real world. The objects you do not see even are also there because Koala sees them through his avatar Ying.

CASE STUDY No. Three

KALI The Godness of the Mileenium: An ad hoc production for The Berliner Festspiele GmbH (Germany). Exhibition: "*Seven Hills. Images and Signs of the 21st Century*" Martin-Gropius-Bau Berlin, 14 May - 29 October 2000
Copyright: Franz Fischnaller 2000 Milano (Italy).

An interactive sculpture of 2metres (eyes level 1.75mts) stands on the top of a hill, immersed in a play of shadows. Three steps lead me to her. A retro projection screen lays at her right foot. Two retro projection screens of 3meters x 2.25meters each are placed on Kali's right and left sides, separated within each other by a glass wall of 225cm.

Kali's event is materialised by Kali's inner world, (it is the virtual world, the world of causes and decision making). Kali's external world is the world of the effects, generated by the participant who is interacting within the virtual worlds.

I approach Kali by walking up three steps, laying my face against hers, looking through her eyes interacting with the devices integrated in her neck, and navigating into KALI's virtual *Inner World* as well as generating inputs and reactioning her *External World*.

KALI'S EXTERNAL WORLD

I was able to generate situations (causes within the VR worlds) through which, it is possible to

see the corresponding real – time consequences (effects), in Kali's External world. Depending upon the input and the output of the Virtual World, on the external screens, the effects of my actions will be projected.

The images, videos, animations, music and sound projected on the external screen are the consequences of my actions. Kali's worlds with all its categories, are contained in Kali's inner world which is the Virtual World. The world of causes and decision making. I was able to navigate and interact by looking through the eyes of Kali, (Kali's external world is the effect). The effects generated by the participant who is conducting and interacting within the virtual worlds.

I approach Kali's body, lay my face towards her face and look through her eyes while I touch her neck. The transparent image of a Kali Yantra occupies my entire field of vision. It is the departure world, the matrix of the virtual world.

It is "Kali's Mother World", the genesis from which the participant can start his exploration. The access to Kali's inner world is possible by navigating and interacting with the mythical icons, spread within *Kali Yantra*, the Supreme Generative Energy. The central point is enclosed by three pentagons a circle and an eight-petal lotus. While the triangle within a female deity's *Yantra* points downward, it points upward within the male deity's *Yantra* ...

Kali Yantra has four gateways, placed in four different petals, each relating to a category. Colliding on it, the visitor gets into the tunnels which will conduct him to the different categories: **A**: Man destroys Nature "the skull", **B**: Nature destroys Man the sword of physical extermination", **C**: Nature and Man live together "the light to dispel fear" and **D**: Kali as a Metaphor of the Jungle "the Queen's spear".

The access to Kali's inner world is possible by navigating and interacting with the icons, spread within Kali Yantra and with the interactive images, objects and figures within the ambiances of the categories. Red is the color of the negative icons; blue is the color of the positive icons.

I start the navigation through *Kali Yantra*. I slip through layers of transparent blue, delicate shiny clouds of petals, moving towards the amazing center of *Kali Yantra*. Shiny rings under the form of a Yony emerges in front of my eyes. The eight petals stand for eight elements; each angle of the petal is interactive ... earth, water, fire, air, ether, mind, intellect and egosens. Instead the fifteen corners of the five concentric triangles represent organs of knowledge, action, perception, procreation and evacuation.

A :Man Destroys Nature

I fly up inside the tunnel, relating to (A) Man Destroy Nature. I am surrounded by flying objects, coming from all directions. Everything becomes a vortex and Flash! The tunnel brings me to a dimension of death and destruction. A skull is in my terrain. I start to wonder if this the city of the 2000's?

I find newspaper headlines with news of war, of destruction, of man destroying man, man destroying nature.. Images appear in front of me like a virtual screen. I navigate within this world of horror. And then I decide to look for the positive icons: the third eye of Kali. I find it. I slip in it to find a solution to the horror! ... And then ... I get into a wonderland which I can perfectionate and transform as I wish! An interactive experience which resembles a surrealistic vision. A space, which contains illusions, dreams, desires, freedom.

B: Nature destroys Man

I decide to go for Nature Destroys Man option. I fly in and get into a singular micro - macro landscape. It's a devastated landscape, utterly destroyed. I find, floating alongside this landscape, a virtual representation of the DNA. Here the DNA represents a positive input of "genetic" events, understood as life. When touching it, fascinating and constructive events occur. Depending upon where I click, they start generating actions in the virtual or in the external digital world projected on the external screens.

Within this apocalyptic terrain I find 6 eggs in the process of incubation, covered by a transparent veil.

What do these harmful eggs contain... Enclosed within them, are devastating natural catastrophes.

C: Man & Nature Lives Together

On my entrance, I find myself in a vortex of light and images - a dreamlike dimension in which the ill fated and the positive seem to coalesce into a common reality. I turn and move forward into a petrified sea of marble of opaque colors, covered with deadly weapons of fear and horror.

Despite the above, it is possible to have absolute consciousness and make decisions of destruction or construction. The objects are revealed as living, synthetic elements, that will induce in me a real - time reaction. I find them here in this ideal, unique environment, rich in symmetry, color and depth. I navigate among them like a fish. I penetrate, touch and go through this virtual world, in which the images are integrated like an articulated world of different layers. The music reacts in conjunction to my inputs, depending upon how and what I touch, where and how I move.

D :Kali as a "Metaphor of the Jungle"

My exploration continues. I navigate toward a light blue transparent gateway and suddenly I see myself flying through a sort of a labyrinth. Here I find the cosmos, the earth, the micro and macro. I can travel endlessly in this fascinating world, and suddenly I see myself flying in a whirlwind of fantastic Indian Sanskrit worlds that call the sounds of the universe. I move forward and discover that they are flying out of the cosmos towards earth through the tunnel of Kali, which is full of Sanskrit symbols. A sort of a symmetrical labyrinth exists, belonging to the cosmos, earth, city and nature. It composes a magical path which conducts me to the positive and negative.

Weapons emerge beneath my feet. It is like a long highway of fear, which by getting close prolongs the horror. In turn, I can go back and seek the flowers, the smiling faces of children which confirms the option of construction. All depends on me. An experience which resembles a surrealistic vision. A space which includes worlds, realities, dreams, desires, fear, horror... what I proceed to select and cause to react, create the results in front of my eyes, as well as on the large external screens.

